Amateur Radio

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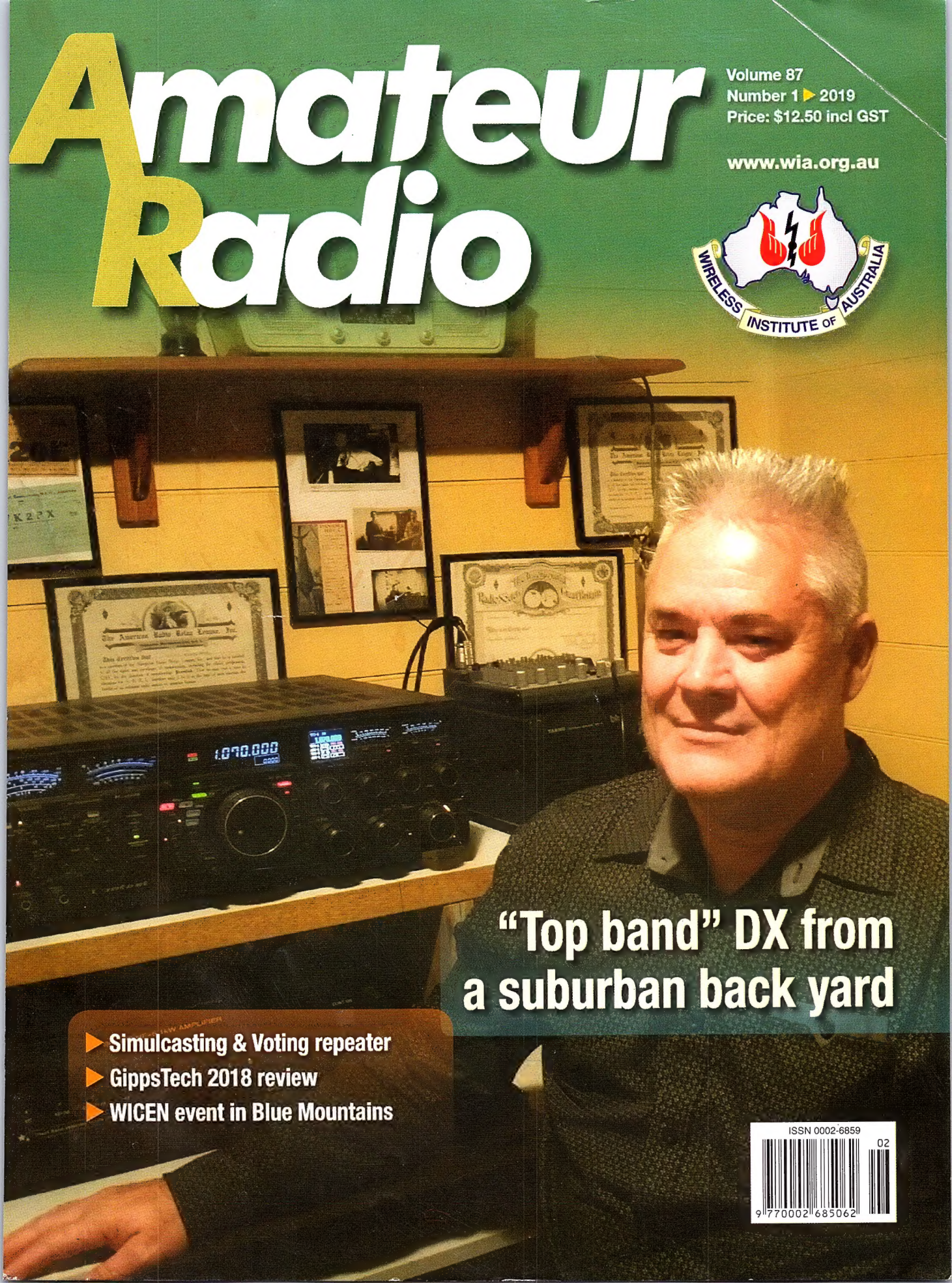

"Top band" DX from a suburban back yard

- Simulcasting & Voting repeater
- GippsTech 2018 review
- WICEN event in Blue Mountains

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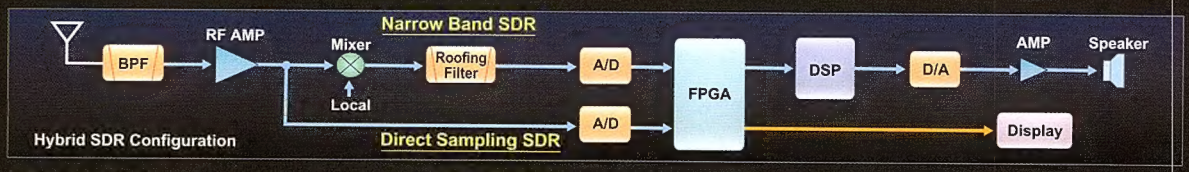
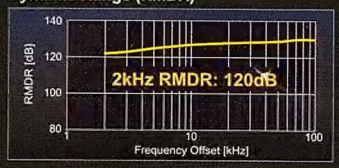
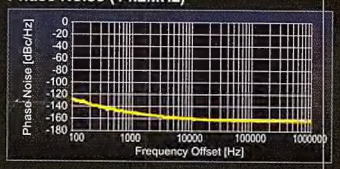


14MHz Band Blocking Dynamic Range (BDR)

14MHz Band Reciprocal Mixing Dynamic Range (RMDR)



1st Local OSC Phase Noise (14.2MHz)



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General

Technical

Columns

This month's cover:
Our cover this issue shows Mike Charteris VK4QS in his shack. Read Mike's story about his exploration of Top Band (160 m) from his suburban house lot on page 11.
Photo by Mike Charteris VK4QS.

Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are welcome and will be considered for publication. Articles attached to email are especially welcome. The WIA cannot be responsible for loss or damage to any material. Information on house style is available from the Editor.

Back Issues
Back issues are available directly from the WIA National Office (until stocks are exhausted), at $8.00 each (including postage within Australia) to members.

Photostat copies
If back issues are unavailable, photocopies of articles are available to members at $2.50 each (plus an additional $2 for each additional issue in which the article appears).

Disclaimer
The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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Editorial

Peter Freeman VK3PF

Happy New Year

Another year has begun. May the year ahead be productive for all readers.

I began the New Year with an activation of a summit in the Riverina region of NSW. The summit was only worth 2 points in the SOTA scheme, but had not been activated previously and I was able to set up my portable station inside both the activation zone of the summit and inside the boundary of the adjacent National Park. The National Park is surrounded by private property, so access to the Park by the public is very restricted.

I had undertaken some detective work over previous months to identify a property which looked as if it may provide an access route and then determining a means to make contact with the landowner. I successfully made contact about three weeks prior to the end of December and received a positive response to my request to access the SOTA summit.

I was on site for approximately three hours and had fun calling and chasing other Activators. I qualified the Summit for both 2018 and 2019, and also qualified the Park for the WWFF scheme. SOTA rules are based on the UTC date and time, so 1 January locally in Australia provides an opportunity to qualify a summit at the end of 2018 (before 1100 local time in Victoria, New South Wales, Tasmania and ACT), to remain on air until after 1100 local and then qualify the summit again for the New Year. It can become very hectic trying to chase other activators due to them changing bands and the prevailing propagation.

My New Year activation was the end of an intensive two weeks of "playing radio" in the field: I spent the last two weeks of December based in Wodonga, catching up with family for a significant birthday and the Christmas celebrations. Most days I was able to head out into the nearby area to activate Parks and/or SOTA summits. Thanks to all the amateurs out there that made the effort to make contact with me.

Contributors

On behalf of the Publications Committee, I extend thanks to all who have contributed material for the magazine over the last 12 months. We rely on all of you to provide the content and then to collate a magazine which is both interesting and informative.

We still need articles to be submitted. Given the reduced number of issues published each year, it may take some time for an article to appear. This is especially true for Technical articles, where we go through a more detailed assessment of the article prior to it becoming available for publication. I thank all authors for their patience – I know that you all hope to see your article published in the next issue, but that is rarely possible. We usually publish all articles submitted, but it may take some time before the article reaches the magazine pages. We rarely reject articles.

I am always looking for high quality images for possible use on the cover.

Continued on page 5

Board comment

Justin Giles-Clark VK7TW

Welcome to 2019...

What has your Board and the WIA been up to in the last two months?

Representation

The IARU Region 3 conference in September 2018 resolved to create a Region 3 Band Planning Committee. The WIA was invited to nominate a person on the committee and following a call to members, Grant Willis VK5GR volunteered to fill this position. Grant is well known to many and his wealth of contesting and IARU experience will be invaluable as he represents Australian interests on behalf of the WIA.

Dale Hughes VK1DSH attended the Working Party 5A meeting in Geneva in November. This is a preparatory meeting prior to WRC-19. The meeting discussed the various study group results in relation to Wireless Power Transfer. In summary there is concern about underestimation of protection distances for amateur bands. Protection will need to be afforded to not only the LF/MF bands but HF bands as well.

The penultimate meeting of the Asia-Pacific Telecommunity Conference Preparatory Group - APG 19-4 has happened on 7-12 January 2019 in Busan, South Korea. This meeting continued to set the Asia Pacific position that is taken to WRC. WRC-19 Agenda Items of amateur interest are 1.1 (50 MHz) and 9.1.6 (Wireless Power Transfer – see later in this Board comment). It is important that amateurs continue to be represented at APG meetings as part of national delegations.

Unfortunately Dale Hughes VK1DSH was unable to attend due to family circumstances and the call went out for interested members. Peter Pokorny VK2EMR answered the call and this is a great example of the depth of skills, knowledge and experience that we have within the amateur community. Peter has recently retired from full-time maritime communications work, and continues to perform small consultancies for the ITU-D sector on maritime radio agenda items. Peter is also a registered "ITU Expert" for maritime radio.

Peter has been involved with ITU matters over the last two ITU study cycles (WRC-12 and WRC-15) in Geneva, and APG meetings. Peter has recently been involved in consultancies for AMSA involving the Indonesian IARU/ORARI representatives and interference into the maritime and amateur HF bands from unauthorised fishing vessel stations and associated land stations.

The Australian Government Head of Delegation was pleased to welcome and invite Peter as part of the delegation.

Promotion

The Board is proud to announce the Michael J. Owen Distinction Medal that is presented in recognition of services to the amateur radio community and the WIA. Michael was influential in shaping the hobby of Amateur Radio locally, regionally and internationally.

Michael was responsible for significant reform of the WIA and Michael's legal drafting skills were second to none, and his ability to clearly articulate his position on a number of issues was of immeasurable value to the hobby.

The IARU is also indebted to Michael's work at the World Radio Conferences and many regional Asia Pacific Telecommunity meetings. In WRC2003 he was responsible for Article 25, which included the abolition of mandatory Morse code, a freeing up of amateur radio involvement in emergency communications and third party traffic. For more information take a look at the article in this *AR* magazine.

A huge congratulations to the Waverley Amateur Radio Society - VK2BV - which turns 100 in 2019 and this celebration will be part of the WIA AGM weekend. Look out for the special event callsign VI2BV100 on air.

Education

In late November 2018 the Australian Communications and Media Authority (ACMA) released the Approach To Market package for the provision of Services related to amateur radio qualifications. This package outlined the future services that the ACMA require for:

1. conducting examinations to assess amateur radio proficiency
2. issuing amateur radio certificates of proficiency
3. making recommendations to the Customer about the allocation of callsigns to amateur licensees,
4. participate in the Syllabus Review Panel, and
5. associated non-statutory administrative functions

At the time of writing the WIA was awaiting a decision from the ACMA

Continued on page 4

Board comment

Continued from page 3

as to who the successful bidder would be. The WIA submitted a competitive bid that met and exceeded the requirements of the ACMA with a much broader vision that addressed the social aspects of amateur radio. The bid also seeks to lower the cost for participants through a contemporary online provision, administration and scalable solution.

Wireless Power Transfer

At the World Radio Conference 2019 in October/November 2019 there is Agenda item 9.1.6 on Wireless Power Transfer (WPT) systems. This is split into two areas – high power transfer systems for electric vehicles (WPT-EV) and low power systems for charging consumer devices. Although both systems have the potential to cause harmful interference the WPT-EV is of serious concern due to the power levels involved.

Candidate frequencies and power levels are being put forward by industry and the following table below has been published in the discussion papers:

Power output of WPT EV systems may reach hundreds of kilowatts and typical transmission range for efficient power transfer is up to a maximum distance of approximately 30 cm. It is inevitable that some energy will be coupled to other conductors and cause stray energy to be radiated as radio waves causing harmful interference. Strict engineering controls will be required to reduce the risk of stray electric or magnetic fields coupling into other conductors and prevent generation of harmonic frequencies and other spurious products.

There have been a number of studies undertaken by incumbent services including broadcasting, amateur, standard time and frequency Maritime radiolocation and low frequency services. All have highlighted there will be a rising noise level for incumbent services and this will affect the usability of that spectrum and may incur economic loss. There is a high probability of harmful interference to amateur bands.

There will be a need to update and review CISPR standards to ensure adequate protection of incumbent services in the spurious and out-of-band domains. There is an IARU recommendation that WPT-EV devices should be classified as short range devices which can afford more protection for incumbent services. If the current standards were to be applied then the unwanted emissions would be at least 40dB higher than environmental noise levels.

This threat is being taken very seriously and we are fortunate to have Dale Hughes VK1DSH leading Working Group 5A covering agenda item 9.1.6 (WPT).

Justin VK7TW

Frequency bands and power levels for WPT-EV*

Categories	Power Level	Frequency band	WPT applications
High power WPT-EV	More than 22 kW	19-25 kHz	Specific heavy-duty electric vehicles (e.g. bus, tram, truck)
	More than 22 kW	55-5X kHz	Specific heavy-duty electric vehicles (e.g. bus, tram, truck)
	More than 22 kW	6Y-65 kHz	Specific heavy-duty electric vehicles (e.g. bus, tram, truck)
Medium power WPT-EV	Up to 22 kW	79-90 kHz	Generic light-duty electric vehicles

WIA news

Amateur Radio qualification and examination services continuity

Having now submitted the tender response to the Australian Communications and Media Authority (ACMA), this communication is to provide you with an update on the WIA's bid to continue to provide qualification and examination services on behalf of the ACMA.

In responding to the ACMA's Approach to Market (ATM) we have not only met the mandatory requirements for the delivery of the statutory and non-statutory functions described in the ATM but have exceeded them by delivering all desired and optional requirements. Our new solution minimises third-party dependencies and current single point risks.

The WIA Education Team is now meeting firstly with WIA Nominated Assessors to bring them up to speed with the WIA's vision for education and qualification of amateur operators. Then we will be extending these sessions to WIA Assessors and WIA Learning Facilitators in the very near future.

The WIA has received a number of queries regarding the status of new examinations beyond the end of the current deed in February 2019. In the event the WIA is successful our proposal contains provisions to allow examinations to continue without interruption. The WIA is actively engaged with the ACMA to ensure that WIA does not impede a smooth transition to a new provider in the event we are not successful.

Background

Approximately 8 weeks ago the WIA put out a public appeal for interested amateur operators and stakeholders to form a team to produce the WIA's response to the ACMA's ATM.

In response to this call we

received positive responses from 12 people from the amateur community including both members and non-members all of whom were accepted and provided the opportunity to participate. Of these, 11 chose to form the new WIA Education Team and participate in developing a response which, if accepted by the ACMA, represents a substantial evolution for both the overall amateur community and WIA in Australia.

The Education Team has adopted a broader vision that seeks to satisfy the social aspects of amateur radio whilst maintaining a vigorous approach to examination, callsign approval and management. Our proposal places significant emphasis on ensuring that future solutions to amateur radio examination and qualification scale readily to meet expanding demand.

Our solution employs best of breed technologies to expand geographic reach, increase depth of penetration within the community, permit tighter turnaround times and reduce the ongoing management cost to the ACMA, WIA and broader amateur community.

WSJT-X 2.0 full release now available

WSJT-X is the very popular extreme weak-signal digital amateur radio mode. WSJT-X implements communication protocols or "modes" called FT8, JT4, JT9, JT65, QRA64, ISCAT, MSK144, and WSPR, as well as one called Echo for detecting and measuring your own radio signals reflected from the Moon.

JT4, JT9, JT65, and QRA64 use nearly identical message structure and source encoding. They use timed 60-second Transmit/Receive (T/R) sequences synchronized with UTC.

JT65 and QRA64 were designed for Earth/Moon/Earth (EME or "moonbounce") on the VHF/UHF bands;

JT65 has also proved popular and effective for worldwide QRP communication at HF.

JT9 is optimized for the LF, MF, and HF bands. It is about 2 dB more sensitive than JT65 while using less than 10% of the bandwidth. With either JT9 or JT65, world-wide QSOs are possible with power levels of a few watts and compromise antennas

JT4 and QRA64 are optimized for EME on the VHF and higher bands, and especially the microwave bands from 2.3 to 24 GHz.

FT8 is operationally similar but uses T/R cycles only 15 seconds long. MSK144 is designed for Meteor Scatter on the VHF bands. These modes offer enhanced message formats with support for nonstandard callsigns and some popular contests.

Version WSJT-X 2.0.0 - has just been released as a General Availability (GA) version.

The FT8 and MSK144 protocols have been enhanced in a way that is not backward compatible with older program versions.

The new protocols become the world-wide standards starting on 10 December, 2018, and all users should upgrade to WSJT-X 2.0 by 1 January, 2019. After that date, only the new FT8 and MSK144 should be used on the air.

Third World Youth ARDF Championships

The WYAC-2019 Organizing Committee and Vinnytsia City Council sincerely wish you a Merry Christmas and a Happy New Year 2019!

We are pleased to announce that the preparation for the 3rd World Youth ARDF Championship is being carried out with the active support of local governments in accordance with the outlined plan. There are no restrictions regarding the entry into Ukraine for citizens of other countries (with an exception for those where a visa regime is provided). We can guarantee the safety for all teams during the stay on the territory of Ukraine, and directly in Vinnytsia. Additionally, we assure that you will get unforgettable and positive impressions after attending the 3rd World Youth ARDF Championship.

We would like to remind you that the preliminary application for the participation in the 3rd World Youth ARDF Championship must be sent out no later than January 20, 2019 (for more information please see in Bulletin No. 1).

Further details can be found via the News item on the WIA website.

Editorial

Continued from page 2

We need good composition and a high quality image received at high resolution. Always take your images at the highest possible resolution and then send a lower resolution image with your article – images at around 1-2 MB as a .jpg file are usually fine for illustrating an article. If we consider an image to be a candidate for a cover, we will make contact and request a higher resolution version. Note that such a request may ask for the larger file with a short delivery time requirement....

Remember, this magazine is for you, the radio amateur. We welcome your suggestions and contributions.

Until next issue,

Cheers,

Peter VK3PF

Building a Simulcasting & Voting Repeater System using VKLink

Hayden Honeywood VK7HH

Introduction

As any repeater builder would know, to make a good efficient working repeater requires a lot of time and energy. Performance of a repeater is shown in its ability to provide proper coverage to the intended target audience. Ideally, we want everyone in the target audience to be able to participate in the same conversation, but sometimes not everybody lives within the coverage area of the repeater. To negate this issue we can link multiple repeaters together through various methods to expand that conversation out. This however, usually requires that the users know the correct frequencies, tones and in the case of mobiles, knowing what repeater actually covers the area they are driving through. What about if we could create a single repeater system that provided coverage over a wider area than could ever be achieved through any one site? How can this even be possible? A little thing on FM called "the capture effect" helps us out.

The theory

Uh oh… that word. Theory! I would not be at all surprised if you skip over this section of the write-up, but bear with me, it (hopefully) will make sense. Adding multiple receivers on the same repeater input frequency and sending all their audio to a central spot to "vote" which one has the strongest is relatively simple, however having multiple transmitters on the one frequency is a bit more of a challenge. Everyone has heard the classic "doubling" that happens when two stations on FM try to talk over one another. This sometimes can be a mixture of the two signals, usually being garbled and unintelligible. However if one user is stronger than the other, they win, and you can only just hear the other station in the background. This is the "capture effect" at work.

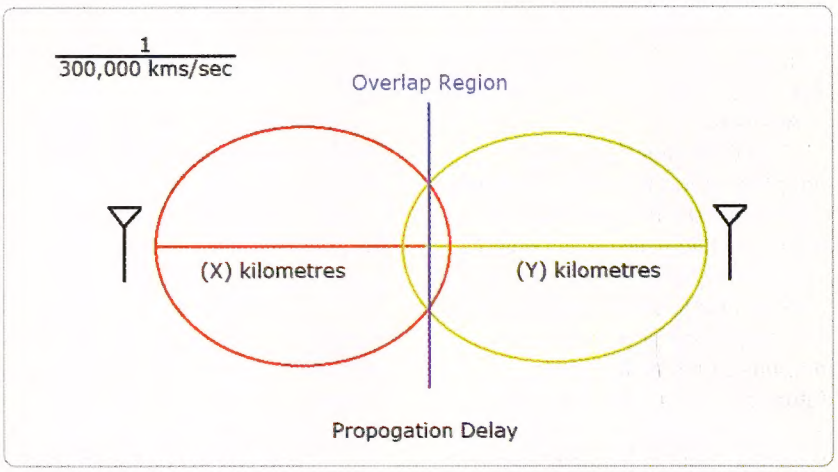
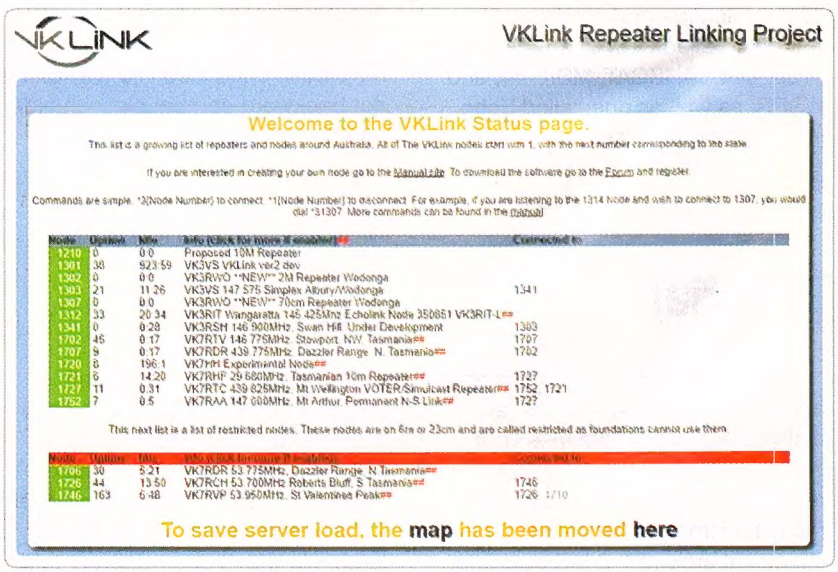


Figure 1: Propagation delay within overlap area.

Now, if we transmit the same information, in this case voice at the same amplitude and phase on two or more transmitters, then a station whose receiver is on the repeater channel will automatically "capture" the stronger of the two transmitters. Sounds simple right? Not quite, there is always a catch. The problem lies in the overlap area – that is when you are "in range" of both transmitters and they are within 10 to 15 dB in signal strength of each other at the receiver. If

Figure 2: A list of VKLink nodes operating around Australia with real-time status.



you are in an overlap area and you are hearing two transmitters equally, and if they are not simulcast properly you will get audio distortion, carrier nulling and so on that causes the audio to be unintelligible.

To simulcast on 70 cm at least requires very precise frequency control, in order of less than 1 Hz of frequency error. Both transmitters have to be tied to GPS for this level of accuracy. The next problem is the speed of light – it does not go fast enough! This affects the ability for the audio from each transmitter to reach the user's receiver in phase. For 10% phase error at 3000 Hz, modulation must arrive at each of the transmitter sites within about 10 microseconds of each other. Each one of the transmitters needs identical audio response characteristics. We also ideally need the audio to arrive at the user's receiver at the same time. Figure 1 demonstrates this. Here we have two transmitters with X and Y distance in kilometres. Ideally we want the received signal within the overlap area to be received at the same time, therefore usually requiring that both X and Y be the same distance. Light travels at 3.3 km/microsecond. Anything approaching 100 microseconds of delay starts to get out of phase and causes distortion, so we need to keep this as low as possible using audio delays.

The biggest problem facing this venture was to build such a system, even just for two sites requires many radios, antennas, feedlines and the list goes on, before we even look at audio delay boards! A commercially produced 2-site simulcast system can commonly cost as much a $200,000! Enter the RTCM/VOTER board powered by the VKLink system.

VKLink and the RTCM/VOTER board

Whilst thinking about ways to expand our coverage on our local repeater system, we had already established an RF based linking system from several UHF 70cm repeaters in the South to the 2 m repeater VK7RAA in the North. This worked well, but did have its problems. We needed a better way of linking. Enter the VKLink system.

VKLink was developed by Matt VK3VS and is a "cut down" version of Asterisk PBX, along with app_rpt – a repeater/linking software module that runs on the Raspberry Pi and allows the interfacing to radios via channel drivers. For the purposes of this article we will refer to app_rpt/Asterisk as VKLink. Matt realised this was a good a way of linking repeaters via VoIP with a Raspberry Pi, a radio and a genuine CM108/199 USB sound card FOB. In later developments, Matt included the ability to be able to use the Pi's GPIO pins for signal switching and any USB sound card for audio. All "nodes" on the system are able to connect to one another, report to a central server and are completely remote controllable – see Figure 2. The whole system works very similarly to IRLP and/or EchoLink, only much better and is more flexible. More information is available at the website: *http://vklink.com.au/*

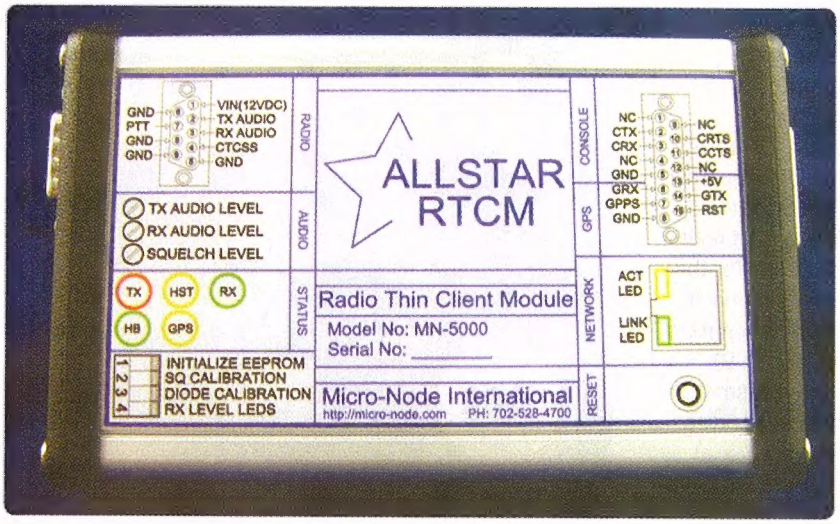
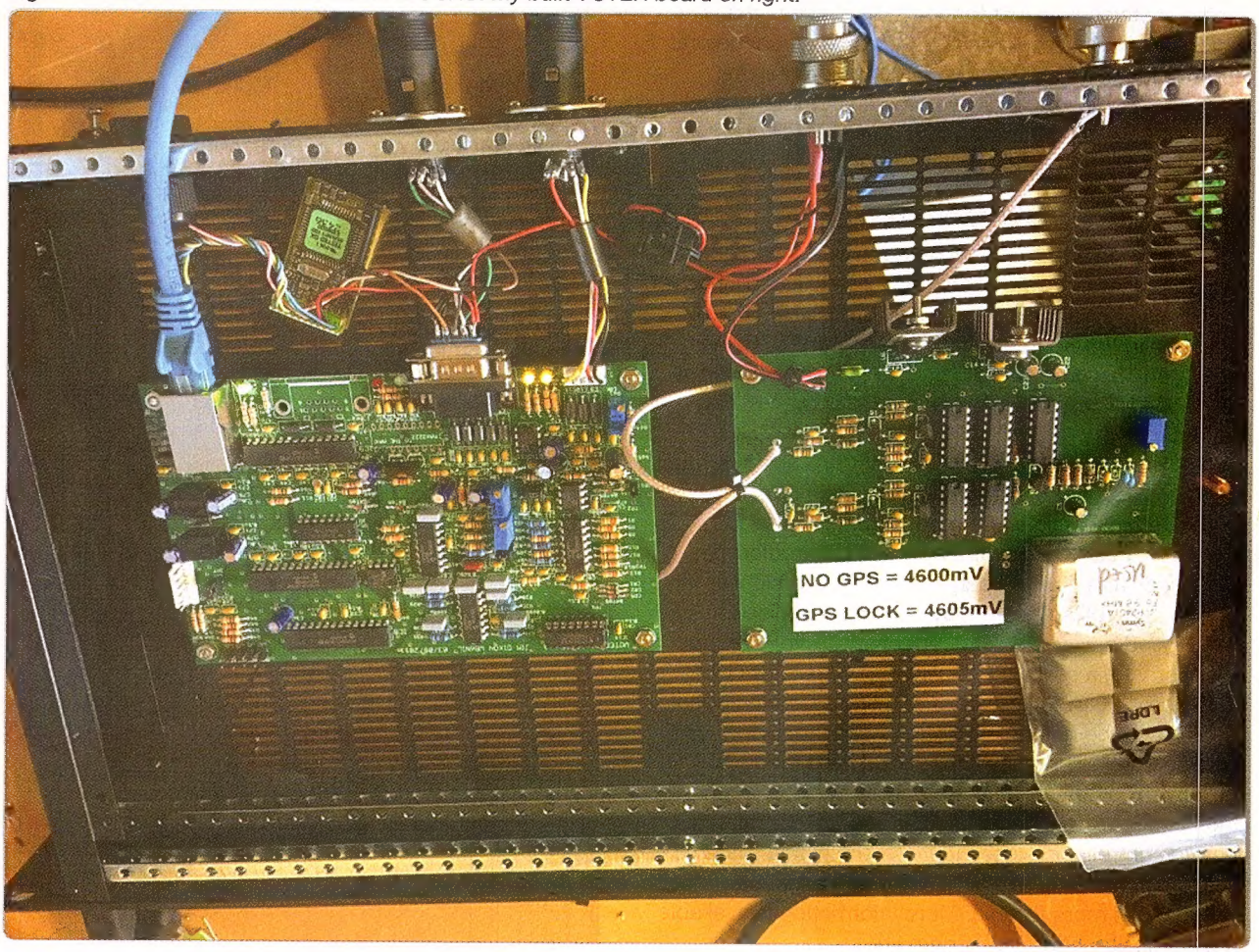


Figure 3: Commercially available RTCM.

VKLink also comes with the chan_voter channel driver. This interfaces with the VOTER (Voice Observing Time Extension for Radio) board or RTCM (Radio Thin Client Module). This was developed by Jim Dixon (SK), WB6NIL in 2011 and is available as a user-assembleable (VOTER) or commercially built module (RTCM). Both have the same functionality, but for the purposes of this article, we will refer to it as the VOTER board. Briefly, the purpose of this board is to interface to a repeater (receiver and/or transmitter), and send as a data stream audio and GPS time stamped data in 20 mS increments to a central server repeater controller (VKLink). The server analyses all these data streams (there is potential for hundreds on any particular system) and "votes" which one has the best Signal to Noise ratio. The server then sends the currently best-voted signal back to one (or more) of the specified transmitters.

As the RTCM was slightly out of my price range, I decided on building several of the VOTER

Figure 4: PLL board on left with 9.6 MHz OCXO. My built VOTER board on right.



boards. I had some PCBs made commercially for a very reasonable price using the open source Gerber files and parts ordered. Each board took around five hours to populate. Out of the box, these units work fine for voting with no modification needed. The PIC that runs everything is clocked by a 9.6 MHz crystal, which is only 25 ppm stable, meaning that at this frequency we could potentially see a variation of +/- 240 Hz. This unfortunately is not stable enough for synchronization of the audio and generation of CTCSS tones (if required) so that they are all in phase among multiple transmitters. Jim WB6NIL said it was impossible to get the PIC to clock to 10 MHz through coding. Another amateur in the United States (Joe KC2IRV) had been undertaking the same project, and he suggested using some 9.6 MHz oven controlled crystal oscillators (OCXO) sourced from eBay. I built a small board to allow small frequency adjustments (within 1Hz) using a voltage control pin on the OCXO and tested on the bench. In the meantime, KC2IRV had been field-testing these and had determined that even though they were a vast improvement over the standard crystal, CTCSS warble in particular was detectable in the overlap areas due to wandering of the OCXO in frequency. He went about designing a PLL board, which was originally part of a Motorola MSF5000 station. The result was a 10 MHz (GPS) signal in, which divides down to lock the 9.6 MHz OCXO in the VOTER boards with the clock reference being tied to GPS and not wandering in frequency, providing a very stable solution.

This modification on the board is not required for simple voting operation.

Making it work using the KL series of radios

As I had a quantity of the Unilab/ Stanilite series of radios, I went about modifying them for this purpose, starting with the standard

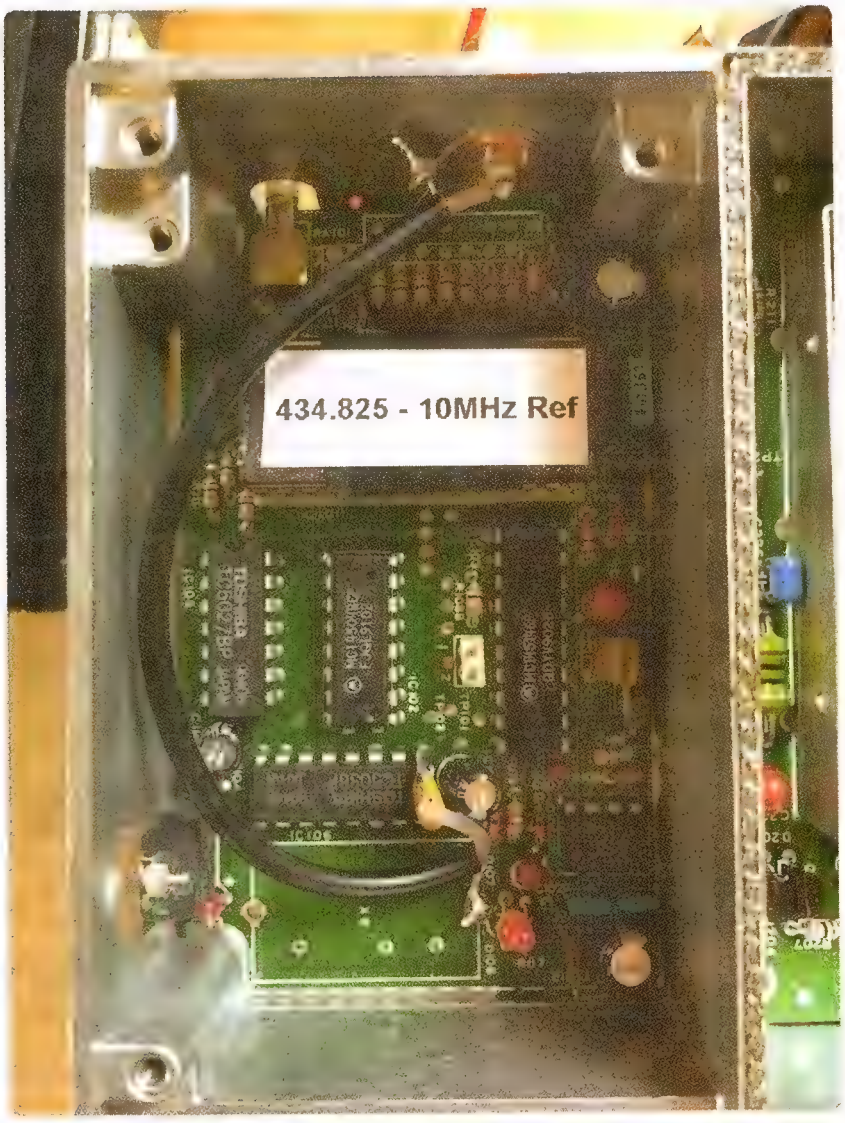


Figure 5: PLL compartment of the KL receiver.

mods. It is almost mandatory using the same model radio when voting, and especially so for simulcast. The KL uses a 12 MHz reference as standard. I wanted this to work using a 10 MHz reference from the GPSDO. Luckily the KL uses a MC145146 PLL and it is trivial to modify some values in the data once generated by the UNIPROG software to divide down and work with 10 MHz. There is more information on this on my blog website. The 12 MHz TCXO is removed and replaced with a short piece of RG174 in the PLL compartment of the receiver. The coax runs to a connector of choice on the back of the receiver module, just above the header. I used an old MCX connector from spares.

The VOTER board needs unfiltered discriminator audio from the receiver. The radio provides a discriminator tap off point, but testing this proved flaky, my guess is there was high-end roll off. Instead, I took it directly from the detector output of the TK10420 discriminator IC.

If simulcasting, the audio needs to go to the exact same point on each transmitter. I found it a good idea to sweep the audio responses and plot them on a graph to make sure they are the same, as any differences in response will be audible in the overlap areas.

Results

The system is currently a two-site simulcast and voted repeater. Performance has been rather impressive with coverage now extending out on one frequency. Changing the audio timing within each individual transmitters VOTER board, the antenna patterns or using differing power levels allows experimentation and improvement in overlap areas. So far, I have observed some level of distortion in overlap areas; however, the audio is still completely intelligible. One thing to note with simulcast is you will never get it perfect in overlap. You might fix one area, but then the problem pops up elsewhere.

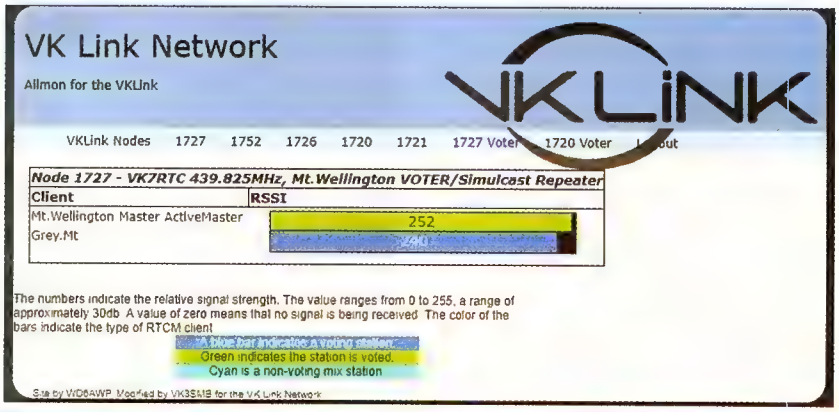
Repeaters voting is available in real time through the VKLink AllMon page as shown in Figure 6. As far as I am aware, this is the only simulcast amateur repeater in VK.

Conclusion

Plans for the future involve expanding the coverage of the 70cm UHF repeater system to include even more sites, moving a 6 metre repeater to simulcast using frequency offsetting due to the longer wavelength involved, and adding multiple voting sites to a 10 metre repeater.

A follow up article will be published shortly to *Amateur Radio* magazine on the VKLink system. For more information on VKLink go to: *http://www.vklink.com.au*

Figure 6. Live RSSI data is viewable from each site.



"Dare to dream on top band": Low band DXing on a shoestring from an Aussie backyard

Michael J Charteris VK4QS/ VK4XQM

Hi, I'm Mike VK4QS and how many times have you read about the achievements of others on the 160 m band. Have you ever wondered if you too could achieve such things in this place they call "Top Band" where hard fought DX is chased? Sometimes, standing in the Aussie Backyard, you just can't help but wonder how it could all be possible from what is written in books, magazines and displayed on websites. The fact is that on the 160 m band, acreage, large arrays and beverages are generally required to be an achiever. So where do you and I fit in with our handkerchief size "Backyards" and the clutter of neighbourhood suburbia threatening to strangle our signals upon transmission. How too can we conquer the MF world and achieve our communications goals on the 160 m Band from an average backyard. Many have dismissed out of hand the whole idea of any sort of antenna for 160 m for a range of sound reasons. Not least for lack of space, let alone residential clutter in the form of homes, sheds, power lines etc. I know this from first-hand experience, plus the fact that everyone kept telling me "You won't do any good on 160 m with your handkerchief sized backyard". And you know what, they are probably bloody right but it never stopped me from giving it a go.

Imagination pays off

Innovation, experimentation and utilizing what is at hand in the true Amateur Spirit combined with a few basic principles is a great place to start. Firstly, vertical polarisation seems to be the best chance for any success on 160 m. The height factor required for horizontal antennas to operate by theory sees our best hopes become Sky-Burners. Others may indeed prove me wrong and I acquiesce. I hope you feel encouraged to do similar to what I have done to achieve success.

My first attempt at operating on 160 m happened about 10 years ago after reading the exploits of many in the "Low Band DXing Handbook" by John Devoldere ON4UN.

Photo 1: Mike VK4QS in his shack.

A radical idea

In fact the first time I actually did something was when I had an 80 m horizontal loop fed at one of the diagonals. I'd seen in a 1960s ARRL Antenna Handbook that if you wanted more gain out of a Dipole, the best thing you could do was to turn it into a loop, separated at both ends. So I decided to apply that theory to my 80 m loop by splitting the ends at the opposite diagonal to the feed point by four feet (1.22 m). I now believed that I had a 160 m dipole in the shape of a diamond. Thus, with a little help from my antenna tuner, I was operational on Top Band. Next morning I was up at 4:30 am for the early morning Interstate 160 m Net that saw stations from VK1, VK2, VK3 and VK4 come up on air. That morning I was the newcomer and the results changed the way I looked at this band. The SSB reports I received were very positive at 5 x 7 to most states with 200 W fed into my theory creation. The next day I had an idea: what if I added another 80 m to the parted ends of this Diamond Dipole and just ran it round the yard on the ground? So sure enough I did exactly that to form what could be described as a 160 m Folded Loop. Then next morning I was on the Interstate net again and guess what...? My reports from all states were in the order of 5x9 +10 and even I was amazed. Now it could have been just good conditions, so I checked into the Net for a week to see what the average report might be and amazingly it was 5x9 each morning.

My first 160 m DX, ZL8X in 2010

The next step was to pop into the Monday Night VK4 160 m net that covered a good part of South East Queensland. The results were even better with reports of 5x9 + 20 dB over, reported by nearly every station on the net. Amazingly that same night after the Net, I went for a tune around 160 m and fell over the ZL8X expedition to the Kermadecs. Here they were at 5x9 SSB to my then QTH of Ipswich. I gave them a call not really expecting a reply let alone a report. To my great surprise ZL8X's response came back with an exchange of 5x9 into Ipswich from the Kermadecs at 2864 kilometres. This was my first ever DX on Top Band. Sadly I never heard any other DX on 160 m whilst living at Ipswich but I was truly inspired from that moment on.

A 5/8th Vertical for 20 m in 2017

Early in 2017, I wanted to build the most effective vertical for the 20 m band that I could. I decided on the much praised 5/8th wavelength vertical with its 3 dB of gain and its approx. 15 degree take off angle. Such a vertical stands 12.5 m tall and with a bit of tweaking by way of the tuner it will work on other bands as well. I had a great deal of personal success using this antenna in both of the CQWW SSB & CW (As a QRP CW Op) Contests of 2017. In late 2017 I decided to have another crack at 160 m having read "MF Down Under" by a good friend of mine David Wescombe-Down VK5BUG. Dave is an ex-Royal Australian Navy Radio Supervisor and what he doesn't know about MF and HF you can write on the back of a postage stamp. Dave's amazing compendium of articles and experience from many fellow Australian Low Band Operators was truly encouraging. Many of these Amateurs only had small yards like me and their experiences show that there was a lot of potential for DXing on 160 m. As I mentioned in the beginning of this article, successful operations on the 160 m band are often characterized by large areas of land and just as large arrays and beverages. I had neither of these fundamental options for success. So I decided to use my 5/8th 20 m vertical with a coil at the base as a starting point. My vertical was the highest antenna I could have by way of Council By-laws; actually 10 metres, but what's an extra 2.5 m between friends.

Dressed to kill: top hat & coil

I consulted with Dave VK5BUG and we came up with a coil with a former of four inch (101.6 mm) poly pipe about a foot long and 50 turns of 2.5 mm copper wire. I tapped it every two turns and mounted that at the base of the 5/8th vertical for 20 m and connected it in line. Moment of Truth....., would this coil add a sufficient amount of inductance to bring me closer to resonance on 160 m? I connected it up to my Transceiver and sure enough there it was – a standing wave ratio of 1.1:1. (Well done Dave!!) The next step was to add some Top Hat wires to the vertical for extra capacitance, in the form of three by 10 m wires strung from the top of the vertical across the back yard to a rope pulled between two 10 m high poles. This in turn allowed the vertical to be seen electrically much larger than it really was to aid any hope of a better transmitted signal.

The Apprenticeship

Here in Australia, most hams who sort out something for 160 m are initially happy to talk SSB or to send CW to their mates on Nets etc. The more adventurous are up early in the mornings for Interstate nets and chats before the "D" Layer kills it all. Others are happy enough with the weekly 160 m night net to catch up with what's going on in their area. Some operators set goals to work all the states in VK, followed later in the year with trying for New Zealand during the Trans-Tasman Contest. The experienced DXers have learnt that Greyline is one of the best opportunities in the mornings and evenings to cast a signal into the ether on Top Band. I did all that and each step was not only great fun but a good learning curve. Now if you live in the USA you have 52 States let alone the possibilities for Canada, the Caribbean and South America, so there is a lot more choice. Out here in Australia we are surrounded by Island nations but almost everywhere else is a long way away, especially the USA,

Africa and Europe. Thus, every contact outside Australia to such destinations is a special moment for the VK operator on Top Band.

95% of DX on Top Band is by way of CW

Now that I had a vertical antenna that would resonate on 160 m, my next hurdle was to seriously learn CW and start calling CQDX. By May of 2018, I was fairly confident at 15 to 18 wpm and I started calling CQDX each night from 9:30 UTC for an hour. I would list myself on DX Summit, by way of frequency and then start sending to see who came back. Now in my opinion there is no band quite like 160 m when it comes to the analogy of "Deep Sea Fishing". Top Band is unpredictable enough as it is and often you never have a clue who will come back to your CQ DX. Yes there are nights when you will bang away on the key to no avail, despite activating a few of the both local and overseas Reverse Beacon Networks. Other nights you will receive calls from out of the blue from stations not even listed on the RBN or DX Summit. Thus there is no rhyme or reason for whoever you are fortunate enough to work on one night or the next.

Success and amazement

On the night of 25 May 2018 at 10:35 UTC I was tuning across the band, when out of the depths I heard KH6DX working 10 kHz down from where I had been transmitting. I thought, OK I will go back and start calling again and see if he hears me. Sure enough at approx. 10:40 UTC I was rewarded with a reply to my CQ DX from KH6DX in Hawaii. It's hard to describe the exhilaration that overwhelms you at such a moment in time. It's a rush of emotion with a feeling of achievement that all your hard work and theory has finally paid off. Don was on Hilo Island, Hawaii, a distance of 7553 kilometres from my QTH in Granville, Queensland. Don had a great signal and I gave him and RST of 579, to which he responded with RST 559 for me. I was speechless; this was the beginning of real DX and it gave me the confidence that my vertical might just conquer the world.

My cup overflows with DX

The next couple of months saw me calling most nights for an hour or so with no real result. I was beginning to think my contact with Don in Hawaii had been a total fluke. Still I kept the faith and on the night of 25 July 2018, I was duly rewarded with not only one but two contacts into Japan. I was calling CQ DX on 1.819 MHz at 10:30 UTC when out of the ether came the CW signal of Ken JN7FAH. Initially surprise and excitement saw me miss a couple of letters in his call and I bumbled along for a few overs before I finally got it. Ken was located in Miyagi, Japan some 7197 kilometres away but has his tower and antennas at a weekend shack near Sendai City. His signal into Granville, Queensland was 579, whilst my report from him was sent to me as 559. On 160 m Ken uses a 23 m tall "T-Hat" vertical with four full size elevated radials.

No sooner had I got over the excitement of it all, than Shige JH2FXK from Aichi answered my CQDX at 10:35 UTC. I gave him an RST of 579 and he kindly reported my signal as 559, for a distance of 6949 kilometres. Shige also has an amazing antenna for Top Band in the form of a 160 m Inverted "L" Type Four Square. Once again I sat there stunned, as here was my little vertical defying the odds and sending a readable signal into Japan.

Hello America

From the very beginning of this radio adventure I had set myself a personal goal to one day work the USA on Top Band. I figured that if I could achieve that with the best antenna I could erect in my backyard, then I had a chance to work most of the remainder of the globe. I set a time frame of 12 months for the best chance to experience the different seasonal conditions in both hemispheres of the world. Well, careful what you wish for, as on the evening of 26 July 2018, just one night after working Japan, my 160 m dream came true. I achieved my goal with a successful two way CW contact between myself VK4QS and N0FW, Peter D. Myer in Hamilton, Ohio. Not only had my signal reached the shores of America's West Coast but it had crossed 90% of continental North America for a distance of 14,511 kilometres. Peter gave me an RST of 559 and in return I sent him 579 with Best 73 from Australia. Words fail me to describe how it actually felt sitting there having conquered my long held goal. Now when it comes to Top Band, Peter is up there with the best of them. Just visit his QRZ page to see his Worked All Zones Award for 160 m plus his 339 Worked and 338 confirmed to realize you are working a serious Low Band DXer. His dedicated antenna system consists of a Full Sized 5 Element Vertical Array for 160 m with a calculated gain of 6.5 dBi. Amazingly, Peter told me that he had heard me over a couple of weeks calling CQ DX, so to work him a further three times after that on 160 m was truly icing on the cake. Most nights that I am on, Peter will list me on DX Summit

for all to see that I am making the trip to Ohio, USA, which is very inspiring to call DX.

Continued Success

After working the USA, you wonder how good can it get and as such my next win was with Antoine 3D2AG with a great signal out of Suva in Fiji. We exchanged 579 and made contact a couple more times after that. A couple of weeks later, on 15 August, I worked another top hand in Cliff ZL4AS from Balclutha in the South Island for 579 both ways. Two nights later I was listed on DX Summit by Eugene RA0FF on the rarely heard Sakhalin Island in Asiatic Russia. I thought well if he can hear me, then I hope he will call me one night as that would be a great contact. Six nights later on 23 August, I was fortunate to have a great contact and work Rob DU7ET out of Negros in the Philippines for a 579 to him and 559 for me. It now seemed like the world was my oyster with these regional countries coming up on Top Band and seeing my country score raise to seven in the space of a few months. Two weeks later on 6 September, I was happily surprised to work Eugene RA0FF up on Sakhalin Island, Asiatic Russia, for a distance of 8525 kilometres. Eugene's QRZ page is quite impressive with his awards and 160 m activity using a full ¼ wave vertical, so keep an ear out for him on Top Band as he is a great catch for rare DX.

Interim synopsis

As you have just read, I have achieved a few good results with a very basic setup on Top Band, namely a simple Vertical, a Coil and some Top Hat wires. One factor that I have not discussed is the other side of the coin when it comes to making a contact on any band let alone 160 m. And that is the corresponding station's equipment and antennas. Often it's the case that the other station does have a big antenna, a big Amp and very good radio equipment. This is the payoff whereby your attempt to try your luck on 160 m with what you can manage is now rewarded with the reciprocal stations ability to actually hear you. Often you hear where a guy makes a QRP contact with just 5 W and the station contacted has stacked Yagis or Beverages, Quads etc. Oh they say, "The other guy did all the work" and perhaps they are right. But none the less if you look at S9 being apparently 50 micro-Volts, then S2/S5 still leaves plenty of room for your station to be heard and your signal to be effective on air.

So give it a go my friends, use your imagination and innovation and dip your toe into the MF World of the 160 m band. Perhaps you will be, as I now am, pleasantly surprised at what can be achieved with the bare minimum in the way of antennas. I would also like to report that all the good gentlemen mentioned in this article have been kind enough to QSL Direct with me. These QSL cards for Top Band are my most treasured experiences on Amateur Radio in 33 years.

Finally let me share with you a real gem, in that Peter N0FW heard me when I was using just 20 Watts CW on 160 m from Australia. That should be encouragement enough for anyone to actually have a go.

I look forward to working you on Top Band one day.

"Dare To Dream"

Best 73

Mike VK4QS

WICEN exercise 22-23 September 2018

Robyn Fallshaw

Photo 1: WICEN command communications bus. (Photo courtesy of Robyn Fallshaw).

On Saturday and Sunday, 22-23 September, six WICEN operators braved the cold of Blackheath to provide communications for the annual Hounslow Classic, in which 300 competitors took part. The Classic involves either a 68 kilometre ultra-marathon or 21 kilometre sky run from the base at Blackheath down into the Grose Valley, Grand Canyon and Blue Gum Forest in the Blue Mountains National Park.

The WICEN communications bus was based at Allview Escape on the edge of the escarpment at Blackheath and was manned for two days by Stephen VK2BOS, Neil VK2XNF and Steve VK2MCA. The three checkpoints located around the perimeter of the valley were manned by Lindsay VK2FLEA, Jan VK2FEB and Kevin VK2CKD.

WICEN deployed two linked DMR repeaters on clifftops to cover the diverse terrain. This network not only allowed our operators to control the network but we could also give portable radios to the Hounslow First Aid team and the Course Sweeps, so that safety communications were available even in the deepest parts of the valley, some 600 metres below the escarpment. On several occasions these radios were used to communicate with a doctor located at the base. The sweeps followed the competitors through the course and using the radios provided, were able to advise when everyone had made it to the other end. The portable radios also provided tracking facilities so that First Aider and Sweep positions could be viewed on a map by the race officials.

WICEN undertakes many exercises like the Hounslow, including the Hawkesbury Canoe Classic and Navshield, to name just a few. If this sounds like an interesting way to use your radio skills, help is always appreciated, not only for the events themselves, but in site reconnaissance, setting up repeaters etc., before the event.

For further information about WICEN please contact *secretary@nsw.wicen.org.au*

Photo 2: DMR repeater, deployed at Pt Pilcher in the Blue Mountains National Park. (Photo courtesy of Robyn Fallshaw).

A coming of age: GippsTech 2018 – the 21st Conference

Roger Harrison VK2ZRH

Once again, on the morning of Saturday 7 July 2018, some 100-plus eager enthusiasts poured into the lecture theatre at the Federation University campus and the Gippsland Technical Conference for 2018 was under way with a crowded program of presentations covering an exciting diversity of topics.

GippsTech 2018 was held over 7-8 July in the rural town of Churchill, just south of Morwell in central Gippsland. Attendees for this event came from VK1 through VK5 and VK7. It was encouraging to see many first-timers. No doubt they returned home from the weekend hooked on Australia's premium technical conference. While GippsTech's primary focus is "on techniques applicable in the VHF, UHF and microwave bands, especially for weak-signal contacts", its scope has broadened over recent years to include presentations on some of the newer technical frontiers in amateur radio, as well as developments in the regulatory frontiers locally and globally.

To the Moon and back

Fittingly, the Conference opened with a presentation by Mike Farrell VK2FLR, titled **Small System EME on 23 cm**. Mike is known to the global EME community from his EME exploits on 2 m and his attendance at northern hemisphere EME conferences from time to time. He pursues his amateur radio interests from his home at Glebe, an inner-city suburb of Sydney. Indeed, you can walk from Mike's home to the CBD.

Mike took the assembled throng on a tour of the thinking, planning and assembly of his 23 cm EME system, which features a 2.1 metre repurposed satellite TV mesh dish cunningly placed so that it's not able to be seen from the street. Some neighbours and local councils frown upon the perceived ugliness of such structures and misunderstand their purpose. It's always good to see and understand how someone else succeeded with a complex project put together from a systems approach.

Chris Skeer VK5MC, widely known among the global EME brigade, presented a talk on "the life and times" of **23 cm EME pioneer, Ron Wilkinson VK3AKC**. Ron was a well-known VHF-UHF operator and homebrewer over the 1950s-1970s. He distinguished himself by making the first moonbounce contact from Australia on 1296 MHz, with a 6.5 m-diameter (20 ft) homebrew dish, a hand-built transverter and kilowatt power amplifier. Ron became SK in 1977. Chris obtained Ron's dish and has pressed it into EME service on various bands over recent years. Chris's presentation included many photos of Ron's pioneering efforts, giving an appreciation of the sort of physical and technological difficulties that had to be overcome to achieve EME success half a century ago.

The indefatigable Rex Moncur VK7MO, a long-time stalwart of the world-wide EME community, gave the GippsTech audience a colourful travelogue of his recent **10/24 GHz EME grid tour to NT/WA and a new 10 GHz EME World Record**. He conducted his EME grid tour over the early half of 2018, travelling across large swathes of the remote reaches of Western Australia and the Northern Territory, activating many sought-after OH and PH grid squares.

On one deployment in Darwin, located off the end of the airport runway, outside the perimeter fence, Rex was challenged by some officers of the Australian Federal Police (AFP). When asked what he was doing, naturally, Rex replied that he was bouncing radio signals off the moon. Better to tell the truth! For some reason, the AFP officers didn't believe him ("Bouncing radio signals off the moon, eh? Yeah, right!"). It was only sorted out and an arrest averted following a series of phone calls to Rex's son and grandson! Rex's 10 GHz rig comprises a 1.13 m solid dish with linear polarisation feed, driven by a 95 watt gallium nitride (GaN) solid-state power amp.

Rex related the details of his 18,900 km 10 GHz EME contact in late-2017 with Jim Malone WA3LBI, showing photos of the station setups at each end. Rex travelled to Meelup on the southwest coast of Western Australia in OF76. WA3LBI was located in FM28 in Delaware, USA. To achieve a zero elevation view of the moon, both stations were situated where they looked out over water. Fittingly, Meelup is an aboriginal word meaning 'place of the rising Moon.' Rex and Jim made their record contact on 9/9/2017. Rex's GippsTech presentations never cease to both entertain and inspire.

Looking to the future

Joe and Julie Gonzales, VK3YSP and VK3FOWL, gave a thought-provoking presentation on **Amateur Radio for Kids**. This husband and wife couple have been on a crusade

Photo 1: Part of the audience during a break in the conference program.

for some years now to demonstrate various applications of amateur radio to primary school students. They have given presentations at past GippsTech Conferences which have always been practical. They have found that hidden transmitter hunting ('foxhunting') and working the low Earth orbiting (LEO) amateur satellites always attract strong interest. It has long been a 'given' that, to survive into the future, amateur radio needs to attract interest from young people. Joe and Julie have a 'formula' showing the way.

The peripatetic Dale Hughes VK1DSH presented- **From the inside looking out: reflections on changing radio regulations and impact upon possible future amateur applications**. For some years, Dale has been the Wireless Institute of Australia (WIA) delegate (representing Australian radio amateurs) on the Australian Government's preparatory groups and delegation to the International Telecommunications Union's (ITU) World Radio Conferences (WRC). He has attended WRC-12 and WRC-15, across which amateur radio made some significant gains. Dale is widely known across the global radio amateur fraternity, particularly within the IARU. In late 2017, Dale was awarded the *Yasme Foundation Excellence Award* for his chairmanship in the WRC Working Group that addressed the allocation of the worldwide 60 m amateur band. More recently, his WRC work was also recognised in receiving the prestigious *IARU Diamond Award* for services rendered to the worldwide amateur radio community.

Dale continues his efforts in this capacity, chairing a Working Group preparing papers for the WRC-19 Agenda Item 1.1, which involves, among other things, considering an allocation of the 50-54 MHz band to the amateur service in Region 1. Needless to say that Dale is well-informed on what's happening within the world of radio regulations and the likely impacts on amateur radio, thoughtfully sharing his insights with the audience.

Technological twists and turns

Antenna analysers have become commonplace over the past decade or so, making the checking and measuring of key antenna characteristics so much more efficient and easier than in decades past. Chris Skeer VK5MC reported on his **Comparison of Rig Expert and N1201SA antenna analysers**. These relatively low-cost analysers offer some sophisticated capabilities of interest to VHF-UHF experimenters and are useable both in the home shack and outdoors on field days. Needless to say, you

'get what you pay for', which came across clearly from Chris's presentation in his characteristic Forest Gump style.

Getting some real miles out of 122 GHz was the subject of a talk by microwave stalwart David Minchin VK5KK. The 2.4 mm band offers challenges to all who venture there! David gave the GippsTech audience a tour-de-force of his experiences in attempting contacts at ever-greater distances, trying to achieve what other amateurs from the northern hemisphere, and locally, have succeeded in doing.

While digital modes, such as the WSJT suite, enjoy considerable popularity, digital voice modes have not fared so well, perhaps held-back by the predominance of the proprietary modes, D-STAR, DMR and C4FM. The fact that they were not inter-operative has proved a dampener on greater deployment. Well, no more, according to Lindsay Harvey VK2AMV / VK2FD, who gave the GippsTech crowd a comprehensive tour of the **Multi-mode digital voice modem**. This is a whole new topic category for GippsTech (although, we've heard from the developer of FreeDV, David Rowe VK5DGR before). The device Lindsay demonstrated is agnostic as to incoming and outgoing modes for a voice repeater, including age-old FM. Transmissions on any chosen mode can be retransmitted on any other mode. Now all we need is a real-time language translator to go with it. Oh, that's right. You can get that on an app for your iPhone!

The dogged duo Joe and Julie Gonzales, VK3YSP and VK3FOWL, having last year demonstrated their Mini Satellite Antenna Rotator, this year served up a presentation on their **Mini Satellite Ground Station**. The system is designed for use in their schools amateur radio program, for tracking the amateur satellites that carry 2 m/70 cm transponders. Again, Joe and Julie have exploited commercial-off-the-shelf (COTS) assemblies to simplify the mechanics and the electronics, driven with freely available software, obtainable from www.sarcnet.org.

In **Build your own SDR**, Joe and Julie Gonzales demonstrated how to put together a highly functional software defined radio using low-cost COTS system components – an SDR dongle cover the 20 MHz to 1 GHz range, a Raspberry Pi3 board and a Micro SDHC Card – all strung together with a GNU software package that enables you to arrange and interconnect graphical building blocks to create and institute your SDR and set up its functionality. Check it out on www.sarcnet.org/projects/project_receiver.html.

Photo 2: Alan VK3XPD speaking about the Microwave Enthusiast Award.

Tim Dixon VK5ZT regaled the audience with: **It's raining development kits**, a riotous rundown on some "single-board digital development kits" now readily available if you are prepared to listen for the devices, track them and then retrieve them once they have returned to Earth. The devices? That would be telling – those present at GippsTech know what to seek plus where and how to track them.

Every workshop – be it kitchen table, shack corner or garage – should have a Swiss Army Knife, the all-purpose tool in the hand tools hamper. Glen English VK1XX generally manages to play "the magician" whenever he appears at GippsTech. For more than a decade, "ref-locking" rigs with a precision frequency source disciplining transceiver or transverter oscillators has swept through the high-performance microwave fraternity.

Indeed, one can readily trace the technologies adopted, adapted and developed in the GippsTech Conference Proceedings going back over its 20-year history, which includes the "X-REF" kit, widely adopted across VK (and even other places beyond our shores). So, on the occasion of the 21st GippsTech, this year, Glen presented the assembled throng with the **All Locker – the new ref-locking option** (aka "Son of X-REF"), a Swiss Army Knife for ref-locking recalcitrant rigs, no matter the frequency generator needing to be disciplined. Thanks for the "magic" this year, Glen.

Jim Henderson VK1AT described his adventures in the **Design and construction of a spectrum analyser covering**

300 MHz to 4 GHz. Jim uses a mix of COTS boards and his own designs together with some clever software tricks to produce a very useful item of test equipment at low cost.

I've seen the light

There's a scene in 'The Blues Brothers' movie in which the principal characters, Jake and Elwood, experience a revelation while James Brown, playing the Reverend Theophilus, sings "Do You See the Light" (look it up on YouTube). The always entertaining Tim Dixon VK5ZT brought that Blues Brothers fervour (Tim reprises actor John Belushi's 'Jake') to his demonstrative presentation – **Light Talkers** – comprehensively covering the pragmatic aspects of the practicalities and pitfalls of designing and making voice-over-light transmitters and receivers. You can always expect flashes of entertainment at a GippsTech Conference and Tim is a past-master at it.

Leaving aside the show business side of things, Glen English VK1XX gave the assembled throng the benefit of his engineering and practical experience with optical fibre in his presentation: **RF over optical fibre: principles and applications for amateur radio**. No doubt optical fibre will find increasing uses across a range of amateur radio endeavours in coming years.

Epilogue

There's a tradition that has been long established in Australia known as "look after your mates". Hence, at the 2018 Central Coast Field in February, I was invited by Steve Blanche VK2KFJ and Dave Scott VK2JDS to join them in a ham convoy to GippsTech 2018 as my wife and long-time GippsTech companion, Val, had passed away the previous December. The plan was to meet up with Steve VK2KFJ in Lithgow and join fellow travellers from the Amateur Radio Central West Group and assorted others, to travel across country to Morwell on Friday 6 July, returning on Monday 9. That cross-country journey takes some 10-11 hours. Convoy companions kept tabs on each other via APRS, mobile HF and VHF-UHF repeaters in-reach along the way. It's a great way to travel. I'm forever grateful for the invite and the travel adventure.

On the Sunday night, after GippsTech had finished and attendees had scattered for home, a bunch of the convoy crew decided to see if they could copy **SSTV** transmissions from the **International Space Station** as there was an overhead pass at a convenient time. This involved a neat bit of technological tomfoolery – using a handheld rig to copy the ISS, which is easily done with its rubber ducky antenna and a smartphone app. You only need to hold the smartphone a hand's-width from the handheld's speaker to copy and decode the SSTV audio from the ISS. Yep, it was a great success! Everyone retired for the night, happy with the GippsTech weekend, before the return road trip to NSW the following day.

GippsTech continues to uphold its tradition of being brain food for the thinking amateur. And it comes with a side serve of social events – the Friday night get-together at "The Top Pub" in Morwell, the Saturday night dinner in the Morwell Club, plus the on-campus lunchtimes and coffee breaks. Plus, there are the partners' tours of the region. The ongoing success of GippsTech is due in no small part to the vision and drive of the convenor, Peter Freeman VK3PF, ably supported by members of the Eastern Zone Amateur Radio Club.

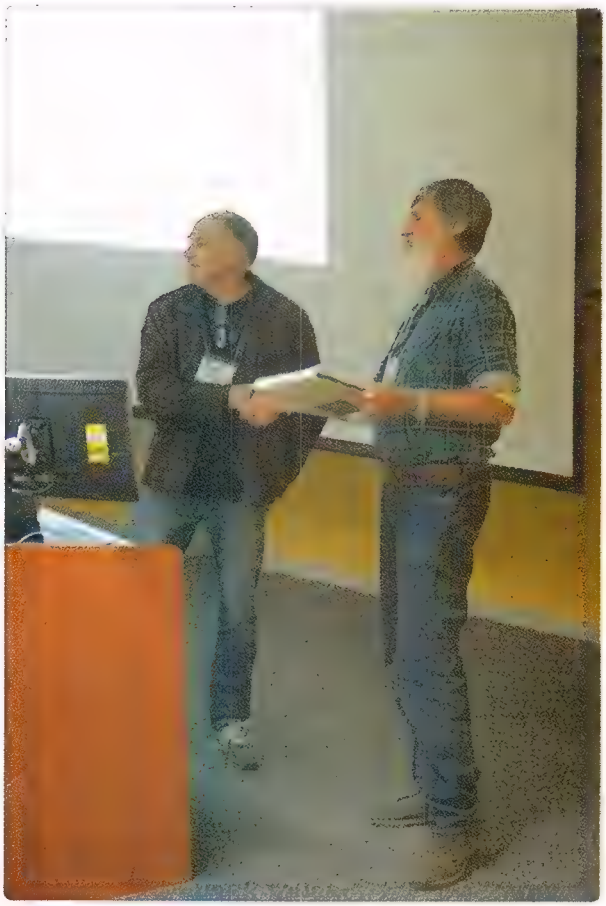


Photo 3: A surprised and delighted Ralph VK3WRE (L) receiving the Microwave Enthusiast Award from Award sponsor Alan VK3XPD.

Dates for submission can be found at the bottom of the page:

http://www.wia.org.au/members/armag/contributing/

An SWR Meter for the Blind – and everyone else!

Jim Tregellas VK5JST

Introduction

This article describes an SWR meter which measures SWR from 160 to 6 metres at power levels from 10 to 100 watts.

It is based around the "Stockton Bridge" which is a beautifully simple circuit completely lacking in any of the usual tweaks and fiddles which occur when setting up competing bridge circuits. This bridge was developed by Warren Breun of the Collins Radio company in the 1960s and came about as result of his general investigation into RF measurement bridges. Many of these circuits were patented and it is only in about the last twenty years or so that this bridge has become general public knowledge.

Like all SWR measuring circuits, it outputs two dc voltages which represent forward and reflected power in the system being monitored.

The development of this project commenced when a blind friend asked whether I could modify one of my two previously published antenna analyser designs to speak. I thought about this for some time and came to the conclusion that such an instrument would be useless for tuning antennas. There are designs around which output SWR data in Morse Code or speech but imagine trying to use such an instrument to tune a sharply

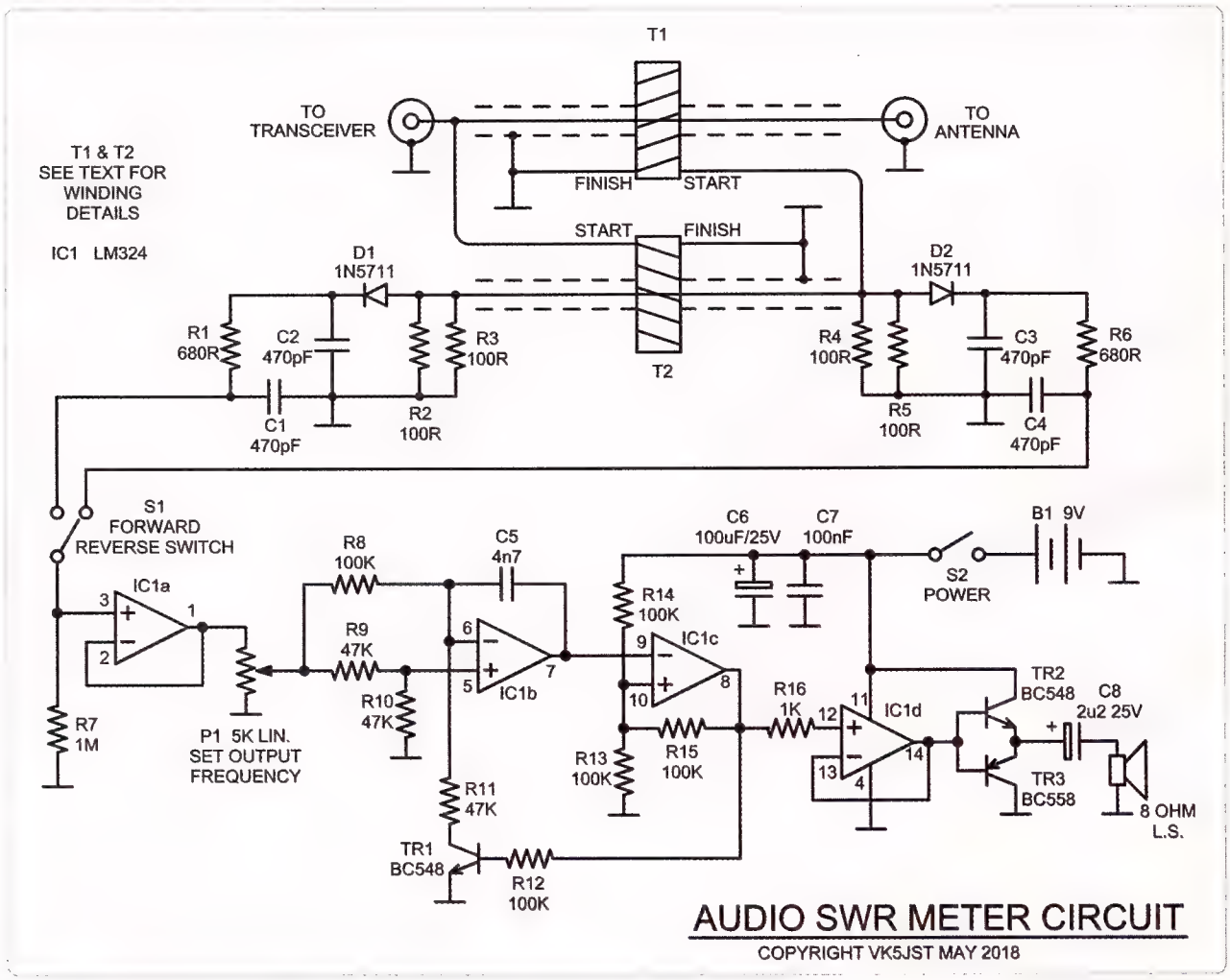


Figure 1: The circuit diagram of the project.

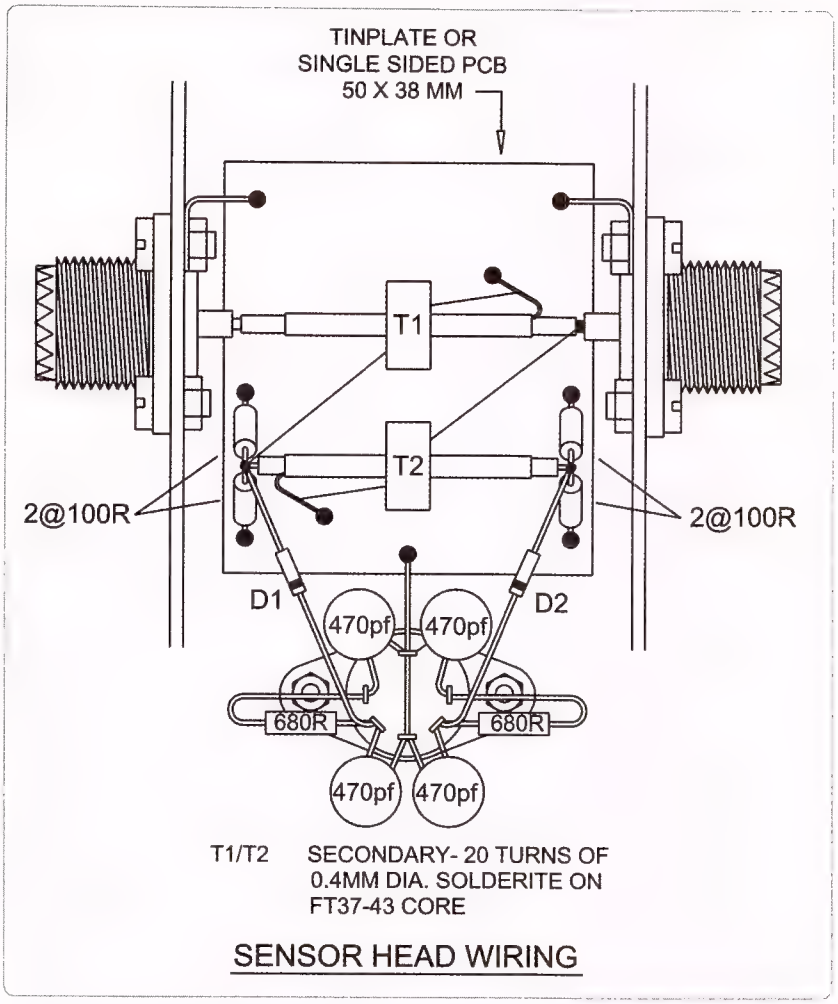


Figure 2: Component overlay for the sensor head.

resonant antenna system containing say a Z match or a magnetic loop while the instrument babbles away. Confusion can be the only result as the time taken to announce SWR is too long to let the user know exactly where they are sitting on the sharply varying SWR curve.

And so this design came about. The user is provided with instantaneous feedback on the SWR by coupling the dc outputs of a Stockton Bridge to an audio VCO to produce audible tones. At 100 watts, the dc output of the bridge representing forward power is around 2.0 volts and this can be used to set the output of a VCO to say 400 Hz.

When the SWR of the system being measured is infinity, both dc outputs of the bridge will be 2.0 volts dc. As the SWR of the system falls, so too does the dc output representing reflected power, which finally reaches zero when the SWR is 1.00. At this point the VCO output frequency will also be zero.

So in summary, at an infinite SWR, the VCO output is 400 Hz, and at an SWR of 1.00, the VCO output is zero. But how can we calibrate this sliding frequency scale?

In a standard SWR meter which displays SWR on a moving coil meter, full scale, which is set by the user during calibration, represents an infinite SWR. An SWR of 3.0 appears at half scale, while an SWR of 1.5 appears at around 25% of full scale. An SWR of 1.2 appears at approximately 12% of full scale. These three different SWR readings occur as the dc voltage applied to the meter circuit (representing reflected power) progressively halves. If we apply these same changes in reflected voltage to a VCO, an SWR of 3.00 will generate 200 Hz, an SWR of 1.5 causes a 100 Hz output, and an SWR of 1.2 gives a frequency of around 50 Hz. These are musical octave steps and it does not take much training to recognize such steps. Of course 5 Hz (a few clicks a second) represents an SWR so close to 1.00 as to not be funny. And the frequency representing an infinite SWR does not have to be 400 Hz. The user can set this to whatever is convenient.

So there it is – a meter with a calibrated musical scale which instantaneously represents SWR which can be used with very little training.

General

The instrument is deliberately constructed in two halves, with the Stockton Bridge measurement head being the first half. Note that this head is a universal element which allows remote monitoring of an antenna system at considerable distances.

Coupled with a standard analogue meter, it can be used to form a standard SWR meter. Teamed up with a micro-processor and LCD, it can form an SWR and Power meter. Another application when used with a microprocessor is to generate automatic ATU designs for either standard wire antennas or magnetic loops. And finally when used with an audio VCO, we have the current design.

The second part of the instrument is the VCO unit and to save precious magazine space, only the component overlay for the VCO printed circuit is given. No details for the VCO box are published as the wiring of this section is completely non critical.

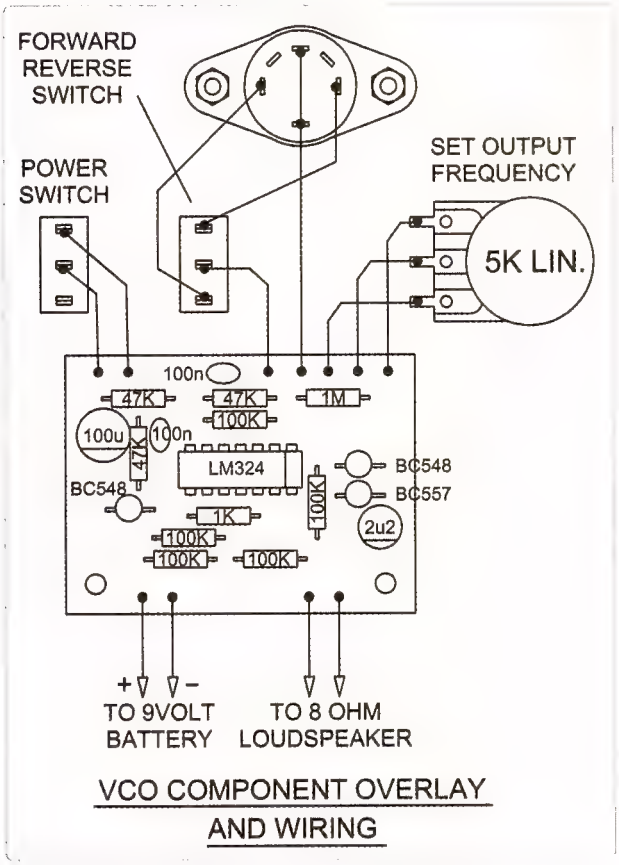


Figure 3: Component overlay/wiring for the VCO unit.

Circuit operation

The only part of the circuit worth describing is the VCO unit. First, note the input switching that allows the VCO circuit to be driven by either of the two detector head dc outputs which represent forward and reflected power. IC1a acts as a buffer amplifier (gain of 1) to provide the measuring head detectors with a very high impedance load. The input to the VCO circuit from IC1a can be adjusted by the user with P1 to give a suitable output frequency to represent forward power. IC1b and IC1c form the VCO, giving a square wave output at pin 8 of the LM324, which in turn is buffered by IC1d. High current loudspeaker drive is provided by TR1 and TR2 which provide a high amplitude square wave at their emitters. To maximize battery life and make very low frequencies easily audible, this square wave is differentiated by using a very small value of coupling capacitor to the loudspeaker (2.2 uF). The loudspeaker is consequently driven with a series of very narrow spikes and the result of this bit of unusual practice is to limit total circuit current to around 1.5 mA at low frequencies (a few Hz) and about 15 mA max at around 400 Hz. The total maximum power input to the circuitry at high frequencies is thus limited to just 135 milliwatts (9 volts x 15 mA) but the audio output is more than adequate.

Construction

First, mark out and drill all holes in the boxes. Pilot drill all holes first, using a drill of around 1.5 mm diameter. A small diameter flexible drill like this will self-centralize in the marking out pricking in the plastic if a long length of drill is left protruding from the chuck. Then drill all holes to size to suit your components. Using an ordinary metal drill to drill plastic is exceedingly dangerous because the high positive rake angles used on the cutting edges will cause the drill to dig in and grab, wrenching the box from your hands or the holding fixture, probably damaging both you and the box. To safely drill plastic with standard drills, reduce the rake angle to zero using your bench grinder and drill slowly.

When all case work is complete, assemble the measurement head first. First, cut two pieces of RG178 coaxial cable to a length of 40 mm (this type of coax. prevents shorts during soldering because the Teflon inner will not melt). Remove 14 mm of the outer covering at one end and twist all the exposed shield wires together to form a 14 mm long pigtail. Next push the inner back through the shield to give equal lengths of inner protruding at each end of the cable, and then strip about 3 mm of insulation from both ends of the inner. Tin the pigtail and both ends of the inner.

Next, wind 20 turns of 0.4 mm diameter wire on to two FT37-43 toroids (from TTS Systems or Minikits), carefully winding both in exactly the same direction and noting start and finish of each winding. Then assemble the coaxial cables and toroids to form two identical assemblies with the toroids in the centre of each length of coaxial cable. Solder the winding finish on each toroid to the 14 mm long cable pigtail on each assembly.

Twist the ends of two sets of 100 ohm resistors together to form two "A" shaped structures, cutting the resistor leads at the bottom of the "A" to around 5 mm long. Solder each of these structures on to opposite edges of the printed circuit board or tin plate baseplate (38 x 50mm); 2 mm in from each side and about 20 mm up from the bottom end of the baseplate. Mount one of the cable/toroid assemblies on the top of these two resistor supports as shown in the assembly drawing, and solder the coax pig tail to the copper surface of the PCB. Insert this assembly into the box.

Next, insert the DIN socket into its hole in the case end, allowing it to rotate and then add the two 680 ohm resistors, four 470 pf capacitors and the flying ground lead **before** you screw the socket into final position.

Now add the two type N or SO239 sockets to the case sides, using 3 mm screws, spring washers, nuts, and two 3 mm bore solder tags. Note the position of these solder tags on the assembly drawing. Each socket has one solder tag on a bottom screw, providing connection from the

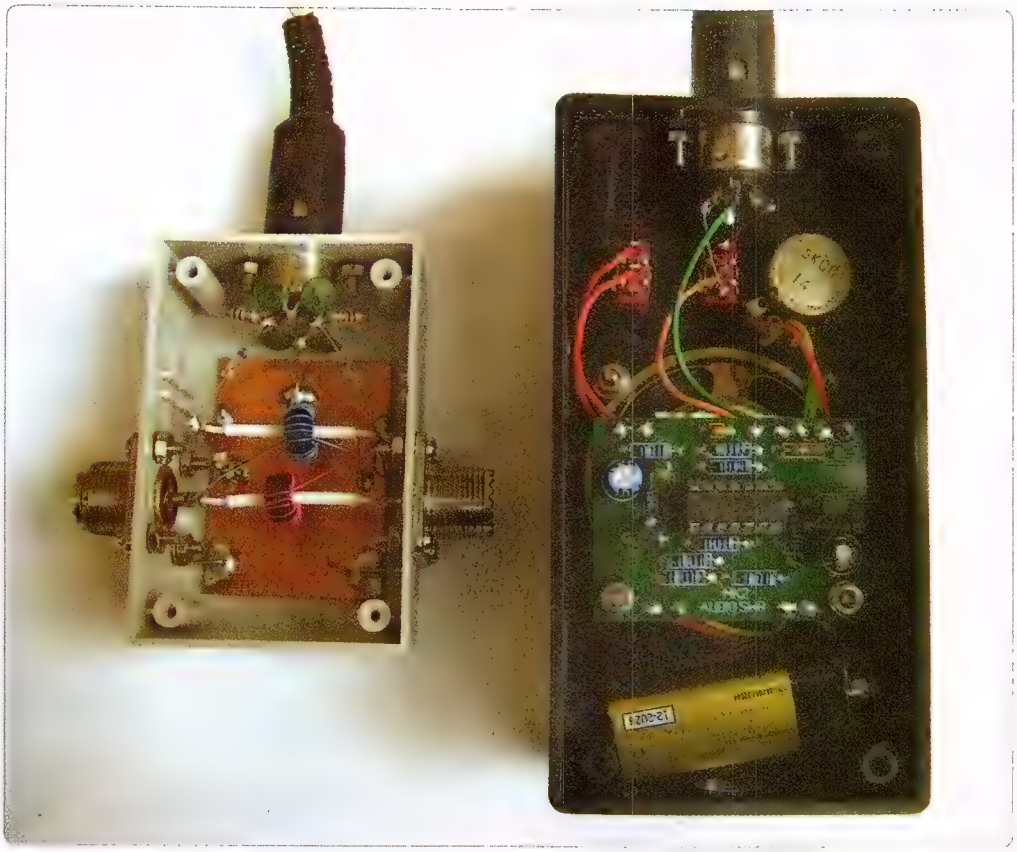


Photo of the rear of the finished units.

Driving the Beast

Connect the sense head into your system between your transceiver and ATU. Set the VCO to sense forward power and switch everything on. To avoid audio feedback which will generate some very odd noises, use an UNMODULATED carrier (CW, RTTY, or AM with zero mic. gain) and set the audio output frequency of the unit to something which suits you. Switch to sense reverse power and adjust your ATU to produce the lowest frequency possible (a few Hz hopefully). You are now tuned up!

socket to the baseplate and hence a continuous connection between the sockets. Keep the solder tags flat while mounting the sockets.

Bend the two solder tags around as shown and solder them to the base plate to keep it in position. Solder the flying earth lead from the DIN socket to the base plate. Add the second cable and toroid assembly, soldering each end of the coax inner to the central pins of the N /SO239 sockets and also soldering the coaxial pigtail to the base plate. Add the two diodes and connect the toroid winding starts as shown in the assembly diagram.

Make up the 3-wire connecting cable between the two boxes to the length you want and you now have a good SWR meter. Congratulations. You can now annoy yourself and the neighbours with high frequency whistles and obscene low frequency noises.

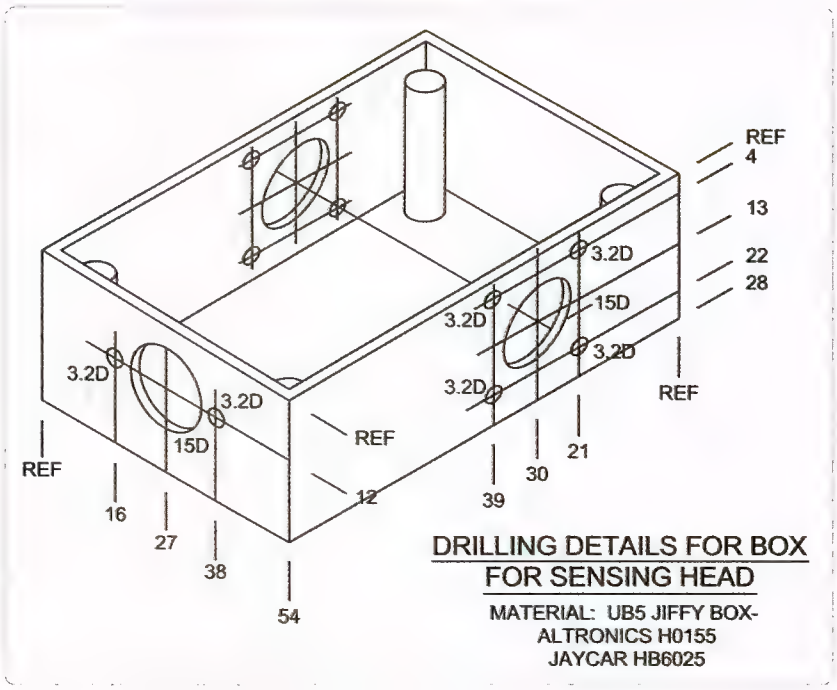


Figure 5: Sensor head box details.

Finally

PCBs are available from the author for $3.00 plus postage. For quantities of over 10 for club projects we can negotiate.

Brisbane Telecommunication and Postal Museum visit

Peter Wolfenden VK3RV

For some attendees of the WIA's 2018 AGM/Radio and Electronics Convention, a visit to the Telstra Museum in the Brisbane suburb of Clayfield was a highlight.

The museum was established in 1952 by Post Office volunteers. At that time all Postal, Telegraph, Telephone and many Radio services (including the Radio Inspectors and ABC radio technical providers), were part of the Post Master General's (PMG) Department.

On Sunday 20 May 2018, a small busload of members travelled from the AGM venue at SeaWorld on the Gold Coast, to the Telstra Museum. It was about an hour's drive and we were met by one of the volunteers who had opened up the museum especially for our group.

The museum is located in an old exchange building in the grounds of the current Clayfield telephone exchange site. It covers two large rooms, with a third occupied by an associated group and all rooms contain a broad range of assorted telecommunications equipment.

Don Welling greeted us on behalf of the museum and was our guide. On entering the building, you are immediately taken back in time to the days of the Post/Telegram Office together with a large range of associated equipment used to provide and maintain those services over the years.

The demonstration of an 1880's Wheatstone High-speed Sender using pre-punched paper message tapes impressed all with its precision mechanics and operating speed – not an electronic switch in sight to generate all those high speed dots and dashes - up to about 180 wpm! Other items included Multiplexers, Teletypes and early Facsimile and image transmitting and receiving devices. The oldest was from 1929; a Fultograph Image Printer, which has a strong resemblance to an early Edison Cylinder reproducer!

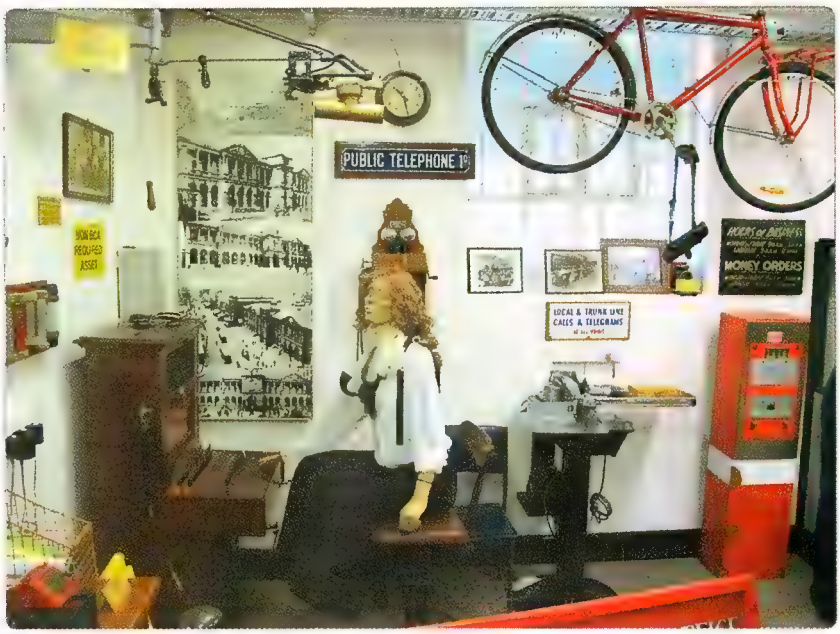


Photo 1: Museum entry point.

Within this exhibition space, there is also a large collection of Morse keys which had some of the team drooling and developing determined desires to look for one or more at ham-fests and flea markets; however, it would be highly unlikely to discover an example of the WWI Signalman's training set!

The next room contained all forms of telephones from the late 1870s, switchboards and telephone exchange equipment together with working examples of exchange equipment from over the years. Our guide explained and demonstrated some of this gear which was more than familiar to a number of our group, who in turn offered further information and idiosyncrasies they had encountered with some of the equipment on display.

This area also contained a 'modern' talking clock, an early SSB radio transceiver used by the Department, together with examples of 'modern' mobile phone equipment. Have you ever wondered what was behind those front panels of the ubiquitous mobile phone antennas? A couple of examples were on display for our 'experts' to mull over while mumbling words of advice on the driven elements 'Q' and phasing principals employed.

A large glass display case held a diversity of communications items which included a variety of components including valves, (receiving and transmitting), a 1934 broadcast condenser microphone, resplendent in its polished mahogany case with station

identification 4.Q.G (Queensland Government), which had replaced the initial Reis carbon studio microphone. This treasure trove also contained crystal sets and other receivers, together with a range of microwave equipment and cathode ray tubes. And that is just a sample!

The visit finished up with a short film in the theatre, which was followed by a vote of thanks from WIA President, Justin VK7TW, on behalf of us all.

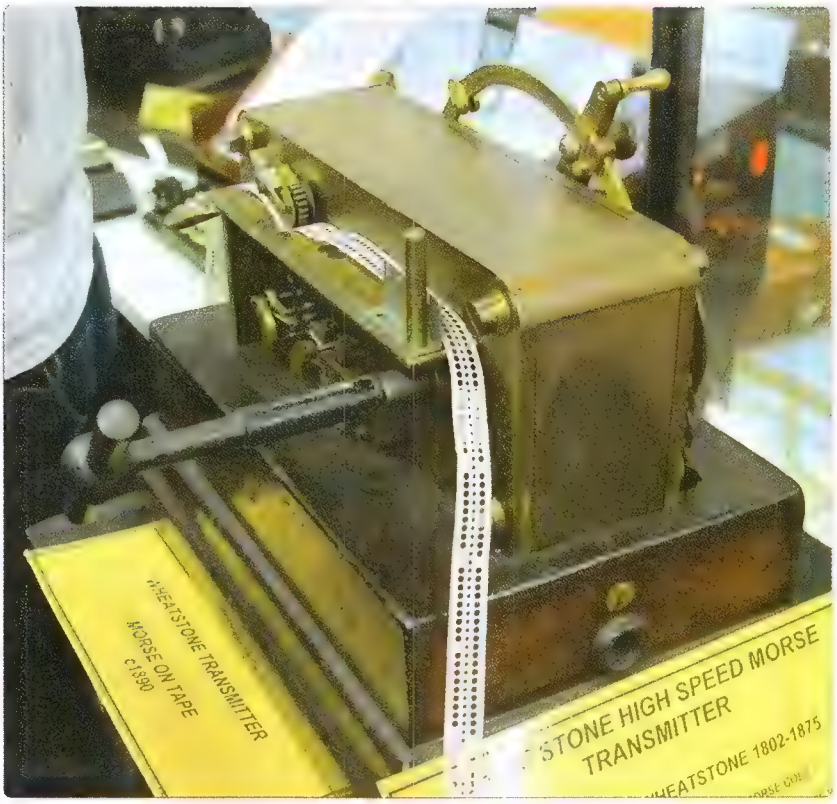


Photo 2: Wheatstone High speed Morse sender.

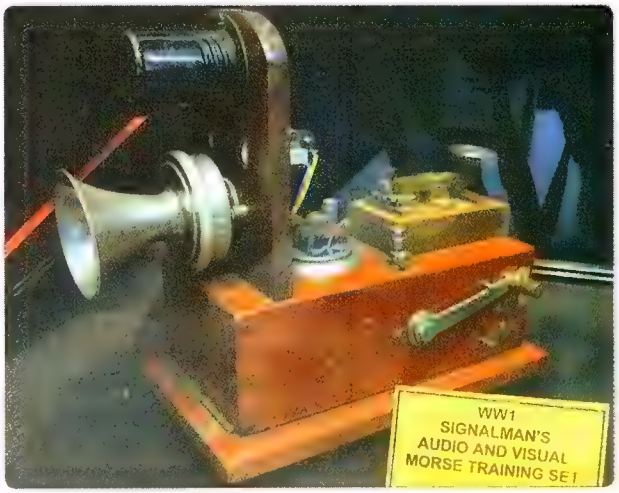
There is little doubt that the Queensland Telstra Museum has a rich collection of equipment and artefacts from the telegraph era through to mobile phones and most in between!

Other Telstra Museums are located in New South Wales (Bankstown) and Victoria (Hawthorn). All are operated by dedicated volunteers who, in most cases were members of the PMG's or Telstra's staff and are well versed in relating the history of the articles under their curatorship.

Adelaide also had a significant telecommunications museum, located at Electra House in King William St from 1976 to 1992. Regrettably, this extensive museum is no longer. A restaurant is now housed in Electra House, the grand building next to the Post office. John Ross an engineer with the PMG Department had a lot to do with this museum. John also wrote two impressive books on radio history, ***A History of Radio in South Australia 1897 -1977,*** (1978, 270 pages), and a much larger tome, ***Radio Broadcasting Technology – 75 Years of Development in Australia,*** (1998, 600pages). I mention these simply because both are great Australian references, irrespective of where you live. However, unfortunately, both are now very hard to find.

Photo 3: Fultograph picture receiver.

Photo 4: AR18074 No.4- WWI Signal man's Training set.



Michael J. Owen Distinction Medal

WIA Board

The WIA Board is proud to announce the Michael J. Owen Distinction Medal. This medal is presented in recognition of services to the amateur radio community and the WIA.

Michael was influential in shaping the hobby of Amateur Radio.

He was responsible for significant reform of the WIA, was well known across the ACMA on a range of issues. His legal drafting skills were second to none, and his ability to clearly articulate his position on a number of issues was of immeasurable value to the hobby.

The International Amateur Radio Union (IARU) is indebted to his work at the World Radio Conferences and many regional Asia Pacific Telecommunity meetings. In WRC2003, he was responsible for Article 25 that included the abolition of mandatory Morse code, a freeing up of amateur radio involvement in emergency communications and third party traffic.

He was also very passionate about the WIA and the Centenary Celebrations held in Canberra. In recognition of this, the image used on the medal is of Michael making the last WIA Centenary contact with ARRL President Kay Craigie in 2010.

The following is a chronology of the contribution Michael Owen VK3KI (SK) made to the hobby of amateur radio internationally and within Australia.

1957

First licensed in 1957 as VK3ZEO, Michael was a foundation member of the Radio Club at Melbourne University. Michael was studying law at Melbourne University.

Michael took an interest in the early days of space exploration and took an interest in Project Australis that was designated AO-5.

1961

In 1961 he joined the WIA Victoria Division Council, a position he held for many years.

Michael, with his legal background, was always interested in the Wireless Telegraphy Act which later in 1983 became the Radiocommunications Act. During the drafting of this act Michael had many meaningful discussions with officers from the Department.

He went on to help form the IARU Region 3 Association.

His achievements through the IARU are legendary particularly as a director of region 3.

1968

Michael was a member of the group who provided the secretariat for the Region 3 Association when it formed in 1968.

1969

He was Federal WIA President from 1969 to 1972 and a WIA Honorary Life Member.

1971

Michael became an IARU Region 3 Director.

1979

He spent 12 weeks in Geneva, as a member of the Australian delegation to ITU WARC 79; one of the most

important ITU conferences in the history of amateur radio.

Among the assignments that Michael drew at WARC-79 was to draft a resolution to exempt the Amateur-Satellite Service from coordination procedures that otherwise have resulted in endless paperwork and great expense.

Michael also received from the Board of the RSGB the prestigious Calcutta Key award, for "Outstanding service to International Friendship through amateur radio".

1980

Michael was a recipient of the Ron Wilkinson Achievement Award with David Wardlaw VK3ADW for their work at the ITU World Administrative Radio Conference 1979.

1989

IARU Vice President for 10 years from 1989-1999.

1997

Retired as a partner in Corrs Chambers Westgarth and its predecessor firms, then a director and General Counsel Quicksilver International for a number of years.

2003

Michael was a member of the IARU Observer Team at a number of World Radiocommunications Conferences, in particular WRC03, where he was responsible for Article 25 that included the abolition of mandatory Morse code, a freeing up of amateur radio involvement in emergency communications and third party traffic.

2004

He was President from 2004-2012 following the restructure of the WIA. Many of today's radio amateurs see him as taking the WIA, in partnership with the late Chris Jones, from its federal structure to a national organisation. In May 2004 the WIA adopted a new Constitution, a lot of work indeed, changing the structure to one of direct membership, governed by a board of directors.

Australian Communications Authority released its findings on a major review of Amateur Radio in Australia. There was to end the Morse code licence requirement, reduction of five licence grades to two and the introduction of the beginners or Foundation licence.

2005

Michael became the Chairman IARU Region 3 at Bangalore in 2005.

2009

Michael worked with many people to transition the WIA Exam Service to a Registered Training Organisation for assessor training and accreditation under a Deed of Agreement with ACMA.

2012

Michael Owen VK3KI died at his home on the afternoon of Saturday 22 September 2012. A Funeral was held on Friday 28 September 2012, at St Andrews Anglican Church, Brighton, Victoria.

The Administrative Council (AC) of the International Amateur Radio Union (IARU) held its annual meeting on 2 & 4 November 2012 in Ho Chi Minh City, Vietnam. Due to the passing of Michael, who had been a member of the Administrative Council for most of its existence and had been a long-time contributor to the efforts of IARU to promote and preserve amateur radio, the AC decided to establish an award in recognition of this service.

The Michael J. Owen VK3KI Award was established to recognise an individual or individuals that best exemplify the dedication and hard work of IARU volunteers.

2013

The Administrative Council of the International Amateur Radio Union at its meeting in Cancun Mexico on Sunday 22 September 2013 jointly award the first Michael J. Owen VK3KI Award to Dr David Wardlaw VK3ADW and Wojciech Nietyksza SP5FM.

2016

WIA Board establishes the M J Owen Distinction Award and awards the first to Peter Wolfenden VK3RV.

2018

Michael J. Owen Distinction Medal is struck.

VK5news Adelaide Hills Amateur Radio Society

Phil Storr VK5SRP

The highlight of this year's activity has to be the refurbishment of the Crafers repeater site. The tower was in a very poor state and would have fallen down if nothing was done to repair it very soon. A massive effort was launched by Barry VK5BW and Dean VK5HMV from Lofty Coaches who also share the site with AHARS and a dedicated band of helpers who got down to the dirty work of cleaning the rust from the tower, repairing its many damaged sections and then applying very special protective coats of paint that will make it last at least another 20 years. Much of this work was carried out over the coldest part of the year, a very big thank you to all the folks who carried out this work, too many to name.

We had a good mix of topics presented at the general meetings and at the Shack Technical sessions. Thank you to all the folk who did these sessions.

The Social mornings on the second Saturday of each month were well attended as were the technical sessions on the fourth Saturday. The social mornings are not just an excuse for a coffee and a chat. At each session, at least one attendee brings along something interesting to show and tell and I am pleased with the depth of technical knowledge there is in the AHARS membership.

Numbers are steadily growing at the second and fourth Friday lunches at the Blackwood RSL. Even though we have to travel from Modbury to Blackwood to attend, Pat and I have become regular attendee.

Thank you to the members of the committee for covering for me while Pat and I travelled round Europe for six weeks this year and spent some time in Hong Kong. Gerard, the vice president, was also away for much of this time and the rest of the committee had to take over the executive tasks running the meetings and other activities.

Again this year, we seem to have been spared most of the Vandal attacks on the shack and the Girl Guides hall this past year. This is being mostly confined to mindless "tag" paint attacks and rubbish strewn round the site. We have a kit of security cameras to discourage these attacks but have not had time to install them as AHARS has been pre-occupied with repairing the Crafers repeater site, cleaning up the fire hazards and repairing the second shed.

The grass around the site did not grow anywhere near as much as last year and we are only now cleaning up the flammable material and disposing of it off the site. The first of these working bees was held on the 3 and 4 November and this included starting work on repairing the other shed as a secure storage site of the Girl Guides association. The second clean-up day was on 25 November and, although there were only eight members who turned up, they put in a massive effort. We were also helped by some of the Girl Guides management and the flammable material was loaded into a skip to be taken off the site.

There will be a number of working bees on Saturdays in the New Year to finish the work on the second shed for the Guides association. We are also going to build a work bench with a drill press, a vice and other metal working tools into our shack so members who have nowhere to do mechanical tasks and assembly at home can use this facility in the shack on the second Saturday morning sessions.

Training and assessment sessions at the shack have been carried out throughout the year by our team of assessors. These include VK5SN, VK5TR, VK5PH, VK5BW and VK5ZQV. Thank you to our small group of assessors who carry out this vital activity.

I must also thank Jim VK5TR and his small band of helpers who put the Antenna Analyser kits together and then posted them round the world. The money raised from this activity has meant AHARS subs have been kept very low for many years. This happy state of affairs will come to an end as Antenna Analyser kit sales have been eroded by a hoard of inferior low cost kits and assembled items available on the web. The ever increasing cost of Australia Post is also making our offering less attractive to amateurs all over the world. Thank you Roy VK5NRG for your effort dealing with the local Post Office and seeing the parcels got off to a good start, on their journey, often to the far flung corners of the earth. We have made the decision not to assemble any more of these kits and once the small stock at hand has sold, there will be no more. Jim is already looking at a new project to replace this kit.

Phil Storr VK5SRP
President AHARS 2018

ALARA

Jenny Wardrop VK3WQ

A happy New Year to you all and I hope that Father Christmas brought you all the new amateur gear that you had hoped for!

In the last issue, we mentioned that ALARA President, Shirley VK5YL, had stopped off for lunch in Sunbury to meet some of the VK3 ALARA members, while on her way to a Lace Convention in Tasmania.

Linda VK7QP continues the story of the "Presidential Lunch"

Shirley VK5YL was in Tasmania for a Lace Convention in mid-October and suggested that it would be a good opportunity for her to meet up with the VK7 ALARA members while she was here.

Following the Lace Convention in Launceston, in the north of the state, Shirley was due to catch the ferry back to the mainland from Devonport on the evening of Sunday 14 October. This meant that a possible VK7 ALARA lunch, somewhere between Launceston and Devonport would be appropriate and possible.

Photo 1: Justin VK7TW and Shirley VK5YL.

We decided on Christmas Hills Raspberry Farm. This proved to be an excellent venue with a delicious menu and good service. Being a Sunday, it was very busy for the staff but they made us feel very welcome and met our every need.

Photo 2: The Group: Left to Right, Front row: Linda VK7QP, Shirley VK5YL, Anne VK7BYL. Second row: Mal and Rosanne VK7NAW, Judy (Linda's sister), Justin VK7TW, Pam (Anne's friend), Helen VK7FOLK, Shirl VK7HSC. Back row: Jon VK7JON, Reuben VK7FREU (Justin's son).

My sister Judy was visiting from England, so we took the opportunity to travel around Tassie on our way to and from the lunch. Mal and Ros VK7NAW chose to do the same. They stayed at Beauty Point the night before, and we stayed there the night after the lunch!

Justin VK7TW, WIA President, was also at the lunch with his son Reuben VK7FREU. On their way from Hobart, they had dropped off Justin's wife Helen in Campbell Town for a Spring Harp Gathering that day.

It was lovely to meet Anne VK7BYL for the first time. Anne is not in good health; however, her friend Pam had encouraged her to come and drove her from Penguin on the north coast. Thanks Pam and we all wish you well Anne.

Shirl VK7HSC came from Sulphur Creek, also on the north coast. Helen VK7FOLK and Jon VK7JON came from Burnie. It is a pity that Dani VK7FREQ, from Launceston, was not able to make it as her partner Greg VK7GX, had unfortunately dislocated his ankle and was unable to travel.

So we all arrived safely and ordered raspberry flavoured or raspberry garnished drinks, then choose from a wide array of main courses to suit every taste; delicious. This was followed by raspberry sweets – cheesecake, carrot cake, Pavlova, fresh raspberries; Yum.

Time for a little exercise and we wandered down to the lake to have some photos taken. Martin VK7GN was photographer, so you won't see him in the pictures. It gave us an opportunity to stretch our legs and have a chance to chat to those who we had not caught up with during the lunch itself.

Photo 3: Linda VK7QP and Shirley VK5YL.

It was time for us then to all go our separate ways. Shirley headed off for the Melbourne ferry and a little more souvenir hunting at the Ashgrove Cheese Factory.

The lunch was a great chance to meet with everyone and get to know each other a little better. It was also an excuse for me to get out of Hobart and tour around Tassie, such a beautiful island, as tourists know but the locals don't get out and about until they have visitors!

Thanks, Shirley, for coming to Tasmania and getting us all together.

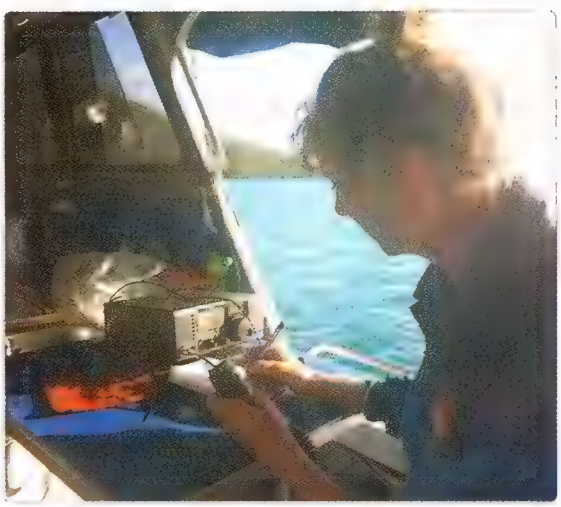


Photo 4: VK4SWE maritime mobile.

And now a message from Shirley

"Ladies why don't you or anyone reading this article, come and join us on the ANZA net on HF. We operate every day on 14.183 MHz at 0515UTC. Sure it's mostly guys but hey, we YLs can use our radios just as well as the OMs. I have a G5RV system running and can receive check-ins from around the world though South Africa is a bit hard at the moment. (Yes, we know, propagation will get better one day!)

We have a 'ladies day' on Thursdays and either Lyn VK4SWE or I are the net controllers. Then, following ANZA and depending on propagation, we have our ROTA net (Recipes on the Air). One doesn't have to be a good cook or submit recipes to become involved, as we just chat about food in general. As Lyn has to cater for visitors to their resort on Sweers Island, she comes up with some very simple, but scrumptious, recipes. Come and join us and let's get those air waves booming with YL voices." 33 Shirley VK5YL.

Coming up

Lyn VK4SWE has been living up to her surname (Battle) on this year's annual boating holiday, doing 'battle' with the elements including dodging high seas and cyclones!

This photo shows calm seas and idyllic weather conditions for boating and playing amateur radio, but adventure was in store!..... More about Lyn's adventures with amateur radio in Australia's far north, in the next issue of *Amateur Radio.*

VK3 news Amateur Radio Victoria

Tony Hambling VK3XV
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ARV Council Election & Annual General Meeting

As per the constitution of the WIA Victorian Division, elections for Council are held every three years. Nominations are invited from financial members to serve on the Council for the next three years, commencing at the conclusion of our AGM to be held at the rooms 40G Victory Blvd. Ashburton 3147 on Tuesday evening 28 May 2019 8 PM.

Nominations close at 5pm on 26 February 2019.

Nomination forms are available from the Secretary *(secretary@amateurradio.com.au)*

VK3RTV Update

The Melbourne ATV Repeater has been de-commissioned at its site at Olinda due to a decision by the Education Department to have the tower dis-mantled. It has now been licenced to operate at Telstra Surrey Hills and also at AR Victoria's site at Mount View. Both of these sites are on very high ground. A week of test operation at Surrey Hills was undertaken with some lessons learnt. We had decided to have the downlink on vertical polarisation as both sites will require omnidirectional coverage. We were lucky enough to salvage a suitable antenna from the Olinda site. Due to the proximity of other services, it was also found that more rigid filtering would be required on the final power amplifier running DVB-T. Amateur Radio Victoria and the Eastern and Mountain Districts Radio Club funded a DVB-T 200 watt final filter which was found to be very adequate for the task.

Receive pre-amplifiers were installed both at the antenna and at the receiver. The noise floor was high but signals that were not detectable were fully decoded with this arrangement. The BER was satisfactory. The coverage was found to be very good given that Surrey Hills is in the metropolitan area but amongst the highest ground to be had apart from Mount Dandenong.

Photo 1: VK3RTV monitors on Test Bench (Photo VK3BFG).

Mount View is direct line of site and about 8 kilometres away from Surrey Hills. Mount View provides good coverage to the east and south east and it is planned to have some type of satellite operation there. There will be internet access at Surrey Hills and experiments are being undertaken to provide access similar to IRLP. On recommendation from Richard Carden VK4XRL, we are going to change the 70 cm output to QPSK as experiments in Brisbane has found this to be advantageous. We have also moved to the new recommended frequency of 445.5. This is 1 MHz lower than the previous allocation and provides a guard band of 459 – 450 MHz. that can be utilised for other repeater links.

The Surrey Hills site is being re-furbished and it is planned that operations will commence in the near future.

The popular ARV Homebrew Group commences activities for 2019

The December 2018 meeting concluded the Fifth consecutive year of regular friendly monthly get-togethers of the Amateur Radio Victoria Homebrew Group.

In appreciation, Group members donated a voucher (for electronic components) to long time organiser and ARV Council member Rob Whitmore VK3MQ.

Current member projects include:

Paul Taylor VK3HN:
Compact transceivers/receivers for SOTA operation.

Joe Gonzales VK3YSP:
Satellite tracking automation and FT817 interface.

Andrew Kayton VK3KIS:
A loop antenna with microcontroller tuning and an interface to an FT-897. A GPS locked frequency reference.

Rob Whitmore VK3MQ:
A patch antenna for 23 cm. A feed horn on 5.76 GHz for an offset dish. A simple field day CAT controller for the FT-817/857/897.

Eric Christer VK3EAC:
A PIC based LCR meter. Also a host of simple weekend projects that have been featured in the Homebrew Group newsletters.

Julie Gonzales VK3FOWL:
Satellite tracking automation and CAT interface

The Homebrew Construction Group of Amateur Radio Victoria aims to promote the good fellowship and exchange of ideas between amateurs who are enthusiastic builders of their own equipment. The meetings are generally very informal and commence with a "Show and Tell" session where projects can be displayed and described. The following discussion usually generates a wealth of ideas for the new comer and experienced constructor alike. The session is followed by a guest speaker, when possible. Homebrewing encompasses almost every aspect of our hobby and those who might not necessarily regard themselves as dedicated homebrewers will find something of interest in this group.

Photo 2: Rob VK3MQ (Left) being presented with voucher by Joe VK3YSP (Right) at Homebrew Group / December 2018 meeting (Photo VK3XV).

2019 meeting dates

2 February, 2 March, 6 April, 4 May, 1 June, 6 July, 3 August, 7 September, 5 October, 2 November and 7 December.

Meetings are held at ARV 40g Victory Blvd. Ashburton 3147 commencing at 2 pm. All welcome!

Contact Rob: *vk3mq@ammateurradio.com.au*

Foundation Licence Course

To check the upcoming scheduled course dates and enrol for this popular course please view "On Line" at: *https://www.amateurradio.com.au/licence/foundation*

Foundation Manuals (and Log Books) are always available via the ARV web shop.

Amateur Radio Victoria activations in 2019

HMAS Castlemaine

VK3WI will be activating the Museum Ship, HMAS Castlemaine, (Gem Pier. Williamstown) across ANZAC Day, 25 April. 2019

International Lighthouse and Lightship Weekend 2019

VK3WI will be active from the Williamstown Time Ball Tower once again for the 2019 ILLW Weekend and for the Remembrance Day Contest.

Both these events are being held on the same weekend in 2019..... 17 & 18 August.

KRMNPA activation period

VK3WI will be activating the Brisbane Ranges National Park. Friday 8 November.

All members are encouraged to participate in these outdoor events. Please contact Tony: *vk3xv@amateurradio.com.au* for further information.

VK7news

Justin Giles-Clark VK7TW
e *vk7tw@wia.org.au*
w *https://groups.io/g/vk7arnews*

Miena Hamfest

What a fantastic day and the Tasmanian weather gods were kind. The biennial VK7 Hamfest was held on Saturday 17 November 2018 in the Central Highlands hamlet of Miena. A huge thank you goes to organiser and coordinator extraordinaire Dani VK7FREQ and her band of helpers. The revised layout worked really well and enabled three breakout sessions given by the WIA, Helen VK7FOLK on World Wide Flora and Fauna (WWFF) and Scott VK7HSE on the changes to configuration in the DMR world. There was a 10 GHz EME display with dishes from Rex VK7MO, Richard VK7ZBX and the author. There were many traders including TET-Emtron all the way from VK6 – a huge thank you. There was an ALARA stand thanks to Linda VK7QP. There was a DMR stand selling DMR handhelds and programming up code-plugs, thanks Clayton VK7ZCR. A SOTA stand thanks Reuben VK7FREU and there were many second hand traders selling a whole host of interesting items. Lunch was fantastic with a huge range of BBQ and other items for sale.

Photo 2: The Miena Hamfest traders tables doing swift trade (Photo courtesy of Justin VK7TW).

Photo 1: Linda VK7QP on the ALARA stand talking with Andrew VK1AD/7 (Photo courtesy of Justin VK7TW).

VK7 Broadcast News

A huge thank you to the VK7 Amateur Radio News Broadcast Team that is more than 15 people these days: readers, news gatherers, contributors and re-broadcasters. There is a 2019 Broadcast Roster that is available in the Group.io group files area. There are still a few gaps to fill and we can always fit more people into the roster. More volunteers means less that everyone has to do. Please think about helping out and send through an email to: *vk7arnews@gmail.com.*

Many still do not realise that the VK7 Amateur Radio News from 9:30 am AEDT goes out on DMR Talk-group 3809 thanks to Clayton VK7ZCR. Have a listen sometime and callback and let Clayton know.

VK7 Repeater News

VK7RHT at Snug Tiers in Southern Tasmania has been upgraded to a 50 W Spectra Engineering MX920. This is thanks to Damien VK7SD and Brian VK7TX. VK7RHT can be accessed on 146.850 with an input 600 kHz lower on 146.250. No CTCSS tone is required.

Mat VK7ML and Hayden VK7HH did the bushwalk into St Valentine's Peak where the 6 m repeater VK7RVP is located. They re-powered the 6 metre repeater and checked for the noise issue that was still present on the repeater. The noise issue may require further investigation on another trip. The repeater frequencies are output 53.950 MHz and input is 52.950 MHz. A 91.5 Hz CTCSS tone may be required until the noise issue is resolved.

VK/ZL TechNet

Hayden VK7HH has started up a VK/ZL TechNet on the VK7RTC/RAA repeaters including the EchoLink and VKLink systems. The first TechNet night saw nine participants from VK/ZL. It happens on Monday nights from 1830 AEDT on the VK7RTC/RAA repeaters. VKLink nodes that are linked in can be viewed at the URL: *http://status.vklink.com.au/* EchoLink users can join in via VK3JUG-R. AllStar users on node 42124. *https://www.facebook.com/vkzltechnet/*

JOTA in VK7

The following is a brief summary of JOTA activity around VK7.

JOTA Spreyton report

Eric VK7EV and 15 Joeys/Cubs attended the Spreyton Scout rooms and radio equipment was setup. They all got to communicate with Joeys/Cubs/Scouts in other places by Radio, had a great time and received their commemorative JOTA/JOTI badge. The theme was nautical and they had octopus for tea, Savs cut to cook and look like octopus and pasta for tentacles.

Paton Park

Ross VK7WP and Rhys VK7FORD were the VHF/UHF operators using repeaters VK7RTV, VK7RDR, VK7RMD and VK7RAA. Phil VK7FILL and Nada VK7FNAD also helped out. Joeys, Cubs and Scouts were able to establish contacts with other scouts at Spreyton, Burnie and Launceston.

Tony VK7AX was on HF using the donated FT-101E from the Ulverstone Scout Clubrooms. Contacts were made with other scouting groups in Canberra, Victoria, New Zealand and Sydney.

Burnie

Burnie scout hall was the venue for the Hellyer district Scouts and Burnie Guides. Computers and networking for JOTI thanks to TasmaNet who provided net connection. HF/VHF/UHF Radios were setup for the JOTA side and many local contacts were made during the morning. IRLP and EchoLink contacts were made world-wide. Thanks to Dave VK7DC, Matt VK7ML, Kirsty VK7FKKK and Aaron VK7AGR.

Launceston

There were about 90 scouting members who attended the NTARC Club Rooms at Rocherlea over the weekend. Thanks to André VK7ZAB, Stefan VK7ZSB, Kevin VK7KJL, Tony VK7YBG, Kevin VK7HKN, Norm VK7KTN, Brendan VK7VIP, Idris VK7ZIR and Yvonne VK7FYMX. Thanks also to Kay and Lorraine who provided dinner on Saturday night. The Northern Area Rover Crew ably led by Adam ran the JOTI operation. Fox hunting on 2 metres was popular as well as the electronic kits. RF contacts were made on UHF/VHF and some on HF although conditions on HF were not good.

Hobart

Noel VK7FLCN and Danny VK7HDM setup radios at The Lea Scout camp over the weekend and made many contacts on HF/VHF/UHF as the Scouts and Guides went through the Camp.

North West News

North West Experimenters Night

Rick VK7RI passes on that a few amateurs have expressed interest in starting up an "Experimenters Night" on the North West coast. As a result of this, we plan on starting these nights in January. At the time of writing, the venue was being sourced but stay tuned to the VK7 Amateur Radio Broadcasts. The venue will more than likely be in the Ulverstone area which is central on the NW coast. If you have a project you are working on, want some help debugging a problem or just want to come along and join in some friendly conversation, then we'd love to see you there. It is hoped these nights will become regular events. If you would like to know more then drop us a line at *nwexperimenters@gmail.com*

North West Tas. Radio & TV Group (NWTR&TVG)

http://www.vk7ax.id.au/atvgroup/

A suggestion was put forward at the NWTR&TVG general meeting in December by Shirley VK7HSC to investigate the formation of a Social Group known as "Chat and Show Group". It is proposed to meet bi-monthly on the off month from the Club bi-monthly meetings. It is a meeting/activity for Amateurs and Interested people in the Community. It will be purely a social afternoon for the radio community and is open to all club and non-club operators and their partners from any location. If there are enough partners they can group in their own section. Bring a plate for afternoon tea and Shirley will arrange tea and coffee. Please pass this information on and let Shirley know if you are coming along. Email Shirley at *franley40@bigpond.com* or mobile: 0417 392 583.

Northern Tasmanian Amateur Radio Club (NTARC)

The NTARC Christmas and annual break-up party was a great success. The BBQs were put to good use for the main meal and then Christmas treats were enjoyed including the Pavlova! There was entertainment from P Anola and of course Christmas carols sung by the NTARC choir.

We congratulate Wayne Tyrril and upgrade assessments for James VK7FJAM and Stuart VK7HSJ. The following callsigns will soon appear on air: Wayne VK7YT, James VK7JAM and Stuart VK7SE. Thanks to Peter VK7PD and Idris VK7ZIR for holding the assessments.

The Wednesday Technical Sessions continued up until Christmas with some of the highlights being: Ross VK7ALH bringing many vintage items and

Trevor VK7TB demonstrated his homebrew twin tone generator and Russian triode.

Bernie VK7BR with the help of Stefan VK7ZSB, James VK7FJAM and Stuart VK7FEAT, worked on a stepper motor controller board. Kevin VK7HKN and Colin VK7ZCF showed off their new test equipment. Peter VK7KPC was playing Raspberry Pi running WSPR, Norm VK7KTN brought along a new Anytone AT-778UV dual band transceiver he had taken delivery for Peter VK7SP. Andrew VK7DW and Kevin VK7HKN were occupied with Andrew's new OpenSpot digital radio access point. Larry, VK7WL brought in several examples of loops produced on his new home brew rolling machine. John VK7FJFG and Simon VK7FSRM were discussing the finer points of algebra, in particular the transposition of formulas.

Radio and Electronics Association of Southern Tasmania Inc

http://www.reast.asn.au/
https://www.facebook.com/reasttas/

On Sunday mornings after the VK7 Amateur Radio News broadcast, a hardy band of 23 cm enthusiasts all point their beams at Mt Wellington and play 23 cm microwaves. There have been a couple of days when there has been more than 10 participants. Even a SOTA activation on 23 cm by Murray VK7ZMS during the 23 cm QSO Party. On ya Murray!

The REAST November car boot sale and BBQ saw 16 car boots open, offering a huge variety of wares including an IC-7300 and Flex SDR gear!

REAST's November presentation was forum format on portable field operations started with Linda VK7QP and WWFF operation. Mitch, VK7XDM was next with SOTA operations.

The author was next with a review of his SOTA kit. Rex VK7MO then took us through his recent portable operation in ZL and Garry VK7JGD finished up with different WICEN portable operations. The presentation was streamed and is available on the REAST YouTube channel.

The REAST end of year BBQ was a great success with both lunch and dinner BBQs being well attended. The Experimenter's nights continue to be popular and here some of the highlights. Rex VK7MO gave a great presentation on his recent 10 GHz EME World Record and has been comparing the stability of a number of GPS Disciplined Oscillators using Spectrum Lab. We decided to rename Rex's title to "EME evangelist" as he is inspiring many amateurs around the world to get involved in small scale QRP microwave EME. On ya Rex!

Paul VK7FPCL was building a crystal tester and demonstrated his small touch sensitive LCD panel for his uBITX.

Murray VK7ZMS and Richard VK7ZBX were working on an Arduino antenna rotator; Murray showed off his recently purchased FT-818 and Ron Cullen was working on his new fixed wing digital radio controller.

Scott VK7HSE was fine tuning the MMDVM modified DR-1X digital voice mode repeater and programming some DMR handhelds.

The author was working on the K3NG Arduino based Az/El GPS antenna rotator controller and a Codan 4401 Power Amplifier he purchased at the Miena Hamfest.

Richard VK7ZBX and Larry VK7WLH undertook some testing using the Club's FT-991A and WSJT-X to test the Doppler shift functionality whilst transmitting.

John VK7FJPA was lucky enough to pick-up a mint condition FT-101B transceiver at an auction house.

Richard VK7RO setup his very nice PC-based Vector Network Analyser and was sweeping a large homebrew dummy load.

The author, Sean VK7FAZE and Ben VK7BEN were beavering away getting the DATV studio back into working condition.

Photo 3: Warren VK7WN and Scott VK7HSE (seated) programming code plugs for DMR (Photo courtesy of Justin VK7TW).

Ross Hull Memorial VHF/UHF Contest January 2019

Details available at: *http://www.wia.org.au/members/contests/rosshull/*

SOTA & Parks

Allen Harvie VK3ARH
e *vk3arh@wia.org.au*

Portable Operations, looking further afield

With the size and abilities of modern equipment, taking a portable station on holidays has become convenient. We are not working to schedule on a DX-Expedition but to exploit a holiday to an attractive site for radio activities. It is not all about exotic locations and rare callsigns. It can be as simple as a Grid square or DXCC location. The equipment the skills and equipment developed as a result of local parks and SOTA activations places us in good stead. So, before heading off on your next holiday or work trip, a quick search of the relevant sites databases reveal opportunities to make you the rare DX:

- SOTA – *https://www.sota.org.uk/Associations*
- WWFF – *https://wwff.co/wwff-data/wwff_directory.pdf*
- IOTA – *https://iota-world.org/*
- DXCC – *https://www.wiaawards.com/view/DXCClist.php*
- Grid Square - *https://www.qrz.com/gridmapper*

If the area is in one of the 48 countries covered by the European Conference of Postal and Telecommunications Administrations (CEPT) agreement which allows Australian Amateurs to travel to and operate from reciprocal licensing arrangements:

- *https://www.acma.gov.au/theACMA/australian-equivalents-to-overseas-amateur-qualifications-table-a*

If the country does not have a Reciprocal agreement, then all is not lost. Approaching the local authorities and following process given enough time will ensure a chance to go there:

- *http://www.iaru.org/member-societies.html*

Photo 1: Equipment packed in a case.

You don't have to be heading overseas. Popular domestic holiday destinations qualify for VK9 which is a callsign and sites in demand:

- *http://parksnpeaks.org/showPark.php#C11*
- *http://parksnpeaks.org/showSummit.php#C9*

Whilst you can use the /9 suffix to your Australia callsign, obtaining a VK9 callsign will ensure you are noticed.

Equipment Considerations

Once operating opportunities have been identified and verified then the selection and transportation of equipment is considered. As radio activations are usually the secondary priority, the goal will be not to attract excessive baggage fees or attention from security or customs.

Hardware selection is easy as usually a case of what you already have at hand but antenna selection should be considered to suit the conditions. Whilst end feds or dipoles supporting 80 m is the norm for typical domestic activations, once remote sites are considered then verticals are a prime candidate.

I recently had the opportunity to travel to Christmas Island to view the red crab migration. Given the SOTA and WWFF park sites on the island, taking the portable kit was on the agenda, however not as the dominant activity.

I decided to take a 20/30/40 m vertical to ensure contacts back to mainland Australia as well as supporting DX contacts. Also, my equipment had to fit within normal passenger luggage requirements. The intent was for the equipment to be placed in checked-in luggage with only the batteries in carry-on baggage.

So, the equipment taken included:

- Elecraft KX3 & Yaesu VX8R
- Mac Air to support FT8 activities.
- GPS and equipment to support SOTA hiking
- 1/4 wave 20/30/40 QRP Guys Vertical (with additional radials)
- 10/80 m end fed & 20 m end fed antennae
- Supporting devices including battery chargers, power supply and spares. When packed into the case, this came in at 9.5 kg.

Whilst the use of a mast is not required as dipoles or end feds which can be set up from trees etc., I decided to use a vertical and it was designed to use a 7 m pole.

Several options exist for the supporting pole:

- 7 m Haverford Squid pole
- 5 m travel pole
- 7 m SOTABEAMS travel pole - *https://www.sotabeams.co.uk/compact-heavy-duty-7-m-23-ft-mast/*

The 5 m travel pole and SOTABEAMS 7 m pole were taken as they will fit within checked in luggage. The 7 m Haverford Squid pole was left behind, as at 1.2 m it exceeded standard luggage so may attract excessive baggage charges.

A Pelican 1485 AIR was selected to protect the equipment which was placed in a standard checked in suitcase, so as not to attract attention. The larger bag served an additional role for clothes and other stuff apparently needed for a holiday.

Batteries

Batteries present additional considerations and are listed as dangerous goods by regulation.

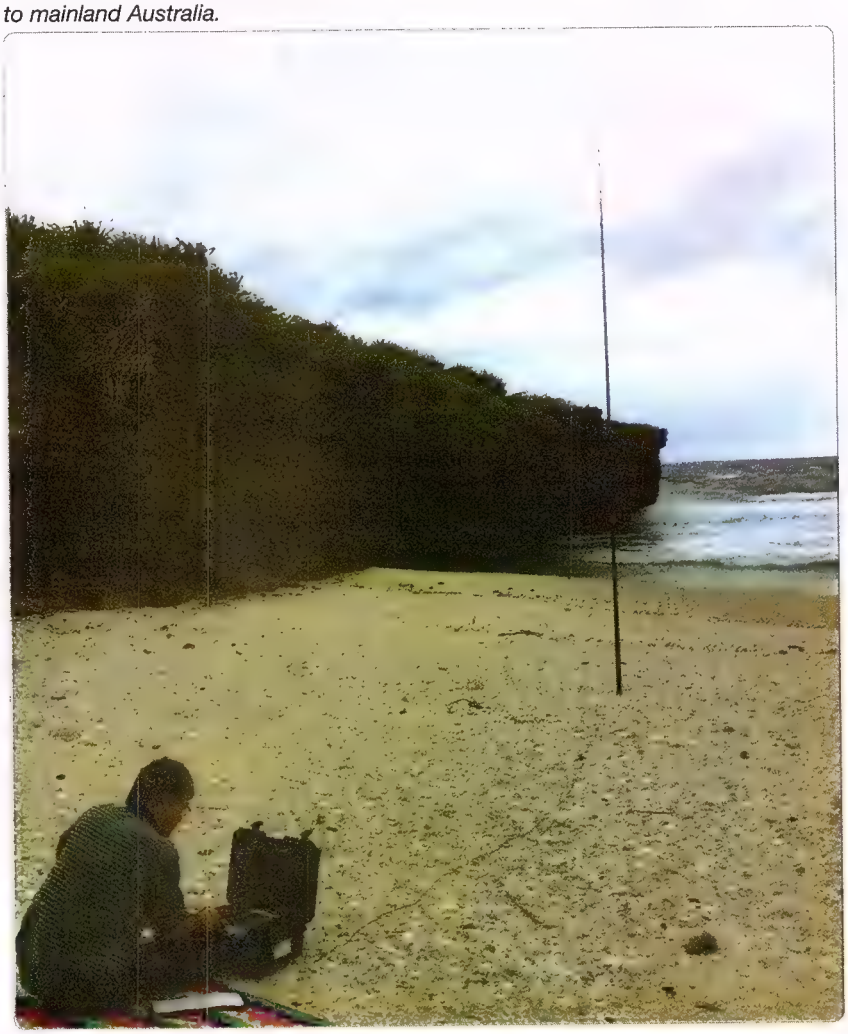
LiPo or LiFePO batteries MUST be in your hand baggage, must have all terminals taped up and may not have a capacity (per battery) of more than 100 Wh. Although the general rules are similar, each airline seems to have its own policy in terms of battery rules, so it's a good idea to check their web site before setting off.

However here are the general rules are available from *https://www.casa.gov.au/standard-page/travelling-safely-batteries* Note that the airlines have the final say on what does and does NOT go onto their planes. It pays to review the relevant section of the restricted items for each airline you will be travelling on and take steps to pre-empt challenges to what you are intending to carry.

How to calculate the Watt hour (W/h) rating of a battery?

The Wh rating of the battery is the key to knowing if the device can travel. The devices typically used

Photo 2: VK9ARH using the Pelican case as operating table in a futile attempt to protect radio from sand and salt. The KX3 and vertical saw excellent reports back to mainland Australia.



by us are within the regulations but again it pays to verify and be prepared by documenting the device. The Wh rating of a battery is based on the voltage and capacity of a battery. The IATA use the Wh rating as estimation on the amount of lithium inside a battery and base their regulations on that.

Wh = number of cells x 3.7 V x Amp hours (for LiFe chemistry batteries)

So for my 4S 4200 mAH LiFe battery would have a Wh rating; 4 x 3.7 x 4.2 = 62.16 Wh, so I am able to travel with this battery as it is under the 100 W/h threshold.

How to determine the total Battery Lithium amount:

This is based on the measure that 100 W/h battery contains 8 g of lithium to get the approximate lithium content in your battery.

8 / (100/battery Wh)

So for the 4S 4200 mAH LiFe:
8 / (100/62.16) = 4.9 g

Finally add appropriate Labels to your batteries.

Just in-case the airport security staff is unaware about battery regulations and challenge the suitability of the devices in your carry-in luggage, it is a good idea to include on each plastic bag notes defining the specifications of the battery in IATA terms or the IATA section 2.3.5.9 to be exact. The label should include the following information:

Complies with IATA section 2.3.5.9:

- Battery Pack Chemistry: LiFePO4
- Battery Pack Capacity: 4200 mAh (4.2 Ah)
- Total Watt hour rating: 62.16 Wh
- Total Battery Lithium: 4.9 g
- Battery Pack Weight: 558 g
- Cell Count: 4

For my efforts, I managed FT8 from the unit, attempted a SOTA activation and two successful WWFF activations: *https://vk3arh.net/2018/12/09/02112018-vk9arh-in-christmas-island-national-park-commonwealth-vkff-0098/*

Given the nature of the trip, it was not compromised with crab spawning and migrations as well as several hikes were achieved; a great outcome for all involved.

For now 73 and 44 to all and looking forward to more adventures in the New Year.

Allen VK3HRA

AMSAT-VK

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Group Moderator
Judy Williams VK2TJU
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Group site:
group.amsat-vk.org

About AMSAT-VK

AMSAT-VK is a group of Australian amateur radio operators who share a common interest in building, launching and communicating with each other through non-commercial amateur radio satellites. Many of our members also have an interest in other space based communications, including listening to and communicating with the International Space Station, Earth-Moon-Earth (EME), monitoring weather (WX) satellites and other spacecraft. AMSAT-VK is the primary point of contact for those interested in becoming involved in amateur radio satellite operations. If you are interested in learning more about satellite operations or just wish to become a member of AMSAT-Australia, please see our website.

AMSAT-VK monthly net
Australian National Satellite net

The Australian National Satellite Net is held on the second Tuesday of the month (except January) at 8.30 pm eastern, that's either 9.30 or 10.30Z depending on daylight saving. Please note we will be taking check-ins from 8.20pm-ish. Check-in starts 10 minutes prior to the start time. The AMSAT-VK net has been running for many years with the aim of allowing amateur radio operators who are operating or have an interest in working in the satellite mode, to make contact with others in order to share their experiences and to catch up on pertinent news. The format also facilitates other aspects like making 'skeds' and for a general 'off-bird' chat. Operators may join the net via EchoLink by connecting to either the *AMSAT* or *VK3JED* conferences. Past experience has shown that the VK3JED server offers clearer audio. The net is also available via IRLP reflector numbers 9558. In addition to the EchoLink conference, the net will also be available via RF on the following repeaters and links.

In New South Wales
VK2RBM Blue Mountains repeater on 147.050 MHz

In Queensland
VK4RRC Redcliffe 146.925 MHz -ve offset IRLP node 6404 EchoLink 44666

In South Australia
VK5TRM, Loxton on 147.175 MHz
VK5RSC, Mt Terrible on 439.825 MHz IRLP node 6278, EchoLink node 399996

In Tasmania
VK7RTV 2 m. Repeater Stowport 146.775 MHz. IRLP 6616

In the Northern Territory
VK8MA, Katherine on 146.750, CTCSS 91.5, IRLP Node 6800

We are keen to have the net carried by other EchoLink or IRLP enabled repeaters and links in order to improve coverage. If you are interested in carrying our net on your system, please contact Paul via email. Frequencies and nodes can change without much notice. Details are put on the AMSAT-VK group site.

Become involved

Amateur satellite operating is one of the most interesting and rewarding modes in our hobby. The birds are relatively easy to access and require very little hardware investment to get started. You can gain access to the FM 'repeaters in the sky' with just a dual band handheld operating on 2 m and 70 cm. These easy-to-use and popular FM satellites will give hams national communications and handheld access into New Zealand at various times through the day and night. Currently only SO-50 is available.

Should you wish to join AMSAT-VK, details are available on the web site or sign-up at our group site as above. Membership is free and you will be made very welcome.

Ross Hull Contest January 2019

DX Talk

Luke Steele VK3HJ
e *vk3hj@wia.org.au*

Other than the usual recurrent coronal holes causing an increase in the solar wind speed periodically, very little has been happening on the sun affecting radio propagation. Solar flux and smoothed sunspot numbers indicate occasional and short-lived small sunspot groups, with little apparent effect on radio conditions.

Around the bands

Forty, thirty and twenty metres still offer some good DX, with openings to most parts of the world at some time. Twenty and 17 m have been opening during our evenings to Europe. Asia and Pacific have been heard most days, with the occasional opening to Africa. Fifteen metres has shown a bit of life again too, with some openings to Europe in the late afternoon. Low Bands are mostly poor, but there has been some activity on 160 and 80 m, mostly Asia and Pacific. This made more difficult by the almost constant storm static.

DX Heard or Worked

The past several weeks have seen quite a lot of DXpedition activity, including YJ0GC Vanuatu, ZL7X Chatham Islands, VK9QR Norfolk Island, VK9XG Christmas Island, VP6D Ducie Island, 5W2TB and 5W7X Samoa, KH8C American Samoa, A35EU Tonga, XT2SZZ Burkina Faso, Z23MD Zimbabwe, EP6RRC Iran, Z6/EI5GM, Z6/EI9FBB, and then Z66DH Kosovo. There has been a bunch of Caribbean and Central American activations. IOTA activations TX0A OC-113 and TX0M OC-297 in French Polynesia were well heard here. Also active have been DT8A South Shetland Islands, XX9ET Macau, 4W/JH2EUV, and XV9D. OX/OZ1LXJ was on a work assignment to Greenland in October. Both JG8NQJ/JD1 Minami Torishima and JD1BMH Ogasawara have been active. Harry JD1BMH has been on Low Bands using CW and FT8 most evenings.

There have been a number of special event callsigns active, including VI4PEACE, GB1WAR, VK3LWF, OP0PPY commemorating the centenary of World War I Armistice. The Hungarian amateur radio association celebrated its 90th anniversary with HG90 stations active. The Radio Amateur Association of Greece celebrated its 60th anniversary in December with a special callsign of SX60RAAG. ZL6YOTA and other Youth On The Air stations were also active in December.

Upcoming DX

Details of upcoming activations will be brief as there are so many. For more details of any activation listed below, visit NG3K's excellent "Announced DX Operations" calendar *https://www.ng3k.com/misc/adxo.html*

Seychelles: S79AA (AF-024) Mahe Island, 5 January - 2 February. 160, 80, 40, 20, 15, 10 m CW and SSB. QSL via LotW.

Sierra Leone: 9LY1JM (AF-037) Banana Island, 9 p 21 January. 160 p 10 m, CW, SSB, RTTY, PSK & FT8. QSL via LotW. For more information, see: *https://9l2019dx.wordpress.com/*

Guadeloupe: FT/F6ITD (NA-102) Desirade Island, 14 January - 31 March. 80 - 6 m, CW, SSB and Digital, including FT8. Will use callsign TO7D during contests. QSL via F6ITD.

Chatham Islands: ZL7/JA0JHQ (OC-038), 17 - 29 January. Focus on 160 m CW and 6 m FT8, but also 40 - 10 m CW and FT8. QSL via LotW.

Rwanda: 9X2AW, 18 January - 14 February. DF2WO in Kigali, with a focus on 160 and 80 m, CW, SSB, RTTY and FT8. QSL via LotW.

Costa Rica: TI5/AA1M and TI5/W1USN, 2 - 13 February. Operating HF using CW and SSB with some Digital. QSL via LotW.

Vietnam: XV9FUD and XV9ZT, 5 - 18 February. SP9FUD and SP2GCJ operating on HF using CW, SSB and Digital. QSL via LotW.

Brunei: V84SAA, 7 - 18 February. DXpedition group operating from Istana Pantai, Tutong District, with a focus on Low Bands.

St Kitts & Nevis: V47KA (NA-104), 11 - 25 February. K1KA operating at the station of V47JA, 160 - 10 m, with a focus on FT8. QSL via LotW. For more information see: *https://www.qrz.com/lookup/v47ka*

Macau: XX9D, 11 - 26 February. DXpedition team, 160 - 6 m, CW, SSB, FT8 & RTTY. QSL via LotW. For more information see: *http://xx9d.mydx.de/*

El Salvador: YS2/KC0W, 15 - 22 February. 80 - 6 m, CW. QSL via KC0W direct.

Burundi: 9U4RI, 15 - 25 February. M0KRI operating on 40 - 15 and 10 m, CW, SSB and PSK31. QSL via M0KRI direct. For more information

see: *https://www.qrz.com/lookup/9u4ri*

Central Kiribati: T31EU (OC-043) Kanton Island, 16 February - 5 March. DXpedition team operating 160 - 10 m, CW, SSB, RTTY and some FT8. QSL via DL2AWG. For more information see: *http://www.kanton2019.de/*

Puerto Rico: KP3RE (NA-249) Culebra Island, 22 - 24 February. DXpedition team operating HF. QSL via LotW.

Chad: TT8RR, 22 February - 7 March. The Italian DXpedition Team operating on HF, CW, SSB and RTTY, and as TT8XX on FT8.

Galapagos: HD8M (SA-004) Santa Cruz Island, 27 February - 6 March. WB2REM, W2WCM and HC5DX operating 160 - 6 m, CW, SSB and Digital. QSL via LotW. For more information see: *https://www.qrz.com/lookup/hd8m*

Bouvet: 3Y0I (AN-002), two weeks activation, Summer.

Maldives: 4S7KKG (AS-003), until 1 April 2019.

3Y0I Bouvet Island DXpedition

The Rebel DX Group Bouvet Island DXpedition team has been in Cape Town for well over a month, preparing for their departure to Bouvet Island. No dates of operation have yet been announced. It will take twelve days to sail to Bouvet Island, with a two-week activation planned. See their website for more information: https://bouvetoya.org/

Please email me with any DX related news for inclusion in this column. I am particularly interested in hearing about DX worked or heard in other states and from newer DXers. I do welcome news from other DXers to add to the DX News!

73 and good DX,
Luke VK3HJ

Silent Key — Wilfred Ernest BOOTH VK4ZNZ

Wilf, as he was known to all, was born on the 19 January 1942 and grew up in Swan Hill. After leaving school he got a job as a telegram boy with the PMG. He then did much study and attended technical schools and graduated as a Senior Technical Officer.

He married Helen on the 31 August 1963 and in the years ahead they had four daughters – Christine, Jodi, Tania and Mandie.

In 1963 whilst Mandie was two years old, they sold up and took up a post at Bamaga near the top of Cape York. Accommodation was basic and supplies had to be ordered well ahead of time. Wilf's duties saw him doing 4WD driving across the numerous rivers and creeks, Jardine and Telegraph Track, before it become a must do for 4WD owners. These trips saw him away doing the necessary repairs and maintenance on the landline telephone system to keep those in the north in contact with the rest of Australia. The telephone system is still in existence at Moreton Telegraph Station that he was responsible for and high above the flood level of the Wenlock River.

After a period of time at Bamaga and numerous close encounters with crocodiles the family moved to Cairns where Wilf worked at the telephone exchange. He also became involved in Amateur Radio and the early 2 metre repeater which was placed on the large mast at Mount Bellenden - Kerr which is the second highest mountain in Queensland.

In 1980 Wilf moved to the Atherton Tablelands and had a house built at Lake Eacham where Wilf assembled a nice amateur station and workshop where he

designed and built many electronic projects. Wilf was working at various exchanges around the Tablelands and was 2IC of the Atherton Exchange.

Wilf was one of the foundation members of the Tableland Radio and Electronics Club where he became involved in the repeaters, teaching radio and Electronics classes using an instructional manual that he had written to assist the trainees to study. Wilf was also an examiner. He also attended numerous Horse Endurance rides doing radio checkpoints.

In the early 1990's Wilf joined the Tableland Radio Group where he was involved in establishing repeaters, Horse rides, JOTA and International Lighthouse Lightship Weekend at Grassy Hill Lighthouse at Cooktown. He also took part in the expeditions out into the Gulf and Cape York region researching its radio and telegraph history. Wilf greatly assisted in establishing telegraph and radio displays at museums at Moreton Telegraph Station, Coen, Musgrave, Laura and Cooktown. On these trips Wilf regularly gave talks about the equipment and history of telecommunications in regional areas to both tourists and locals.

A humorous part of Wilf's radio life was his strong resistance for learning Morse code for a lot of his life until in the last few years he built a replica telegraph which was heavily used at the FNQ JOTA weekends at Malanda. XYL Helen thought it extremely humorous to see Wilf teaching the Scouts/Guides and Cubs at JOTA the Morse code after so many years of resisting same!

Another humorous occurrence occurred during the Queensland Horse Endurance State Titles at Wondecla, near Herberton, when Alan VK4HBN was trying to find a checkpoint and asked Wilf for details of its location. Wilf's response was "it's near a prominent green tree"; there was then a pregnant pause, then Alan responded " which one of the bloody thousands of green trees is that one", at which both radio operators and the horse endurance folk in hearing range broke up in laughter!

Wilf and Helen's girls have given them 15 grandchildren and 16 great grandchildren. During Wilf's fight against cancer over the last four years he appreciated the visits by his huge family and close amateur radio friends. Wilf enjoyed reading his AR magazine and keeping in touch with his many acquaintances he had met during his many years in Amateur Radio.

Wilf went Silent Key 22 February 2018.

Vale Wilf.

A good friend.

Mike Patterson VK4MIK & Gavin Riebelt VK4ZZ

VK2news

Tim Mills VK2ZTM
e vk2ztm@wia.org.au

Another new year is upon us as we enter into our 109th year as the world's oldest National Amateur Radio Society. Not that far behind us is the Waverley Amateur Radio Society who will celebrate their Centenary this year. They trace their origin back to a meeting in early 1919 in the Sydney Eastern suburb of Waverley. Today they operate out of their harbour side club rooms in Rose Bay, still in the Eastern suburbs.

Dick Smith VK2DIK visits ARNSW

ARNSW was pleased to have Dick Smith VK2DIK as their guest at a large gathering at the VK2WI Dural site on Sunday 2 December 2018. The day started at 11 am with a barbecue lunch. Just before one o'clock, Dick arrived by his helicopter, landing at the nearby Pacific Hills Christian School and was chauffeured to VK2WI by Al VK2OK in his Willys Jeep to ARNSW.

Dick kept the audience enthralled with his stories about his life, early days in business, Dick Smith Electronics, his other ventures and adventures. Dick's talk ended with a Q and A session with listeners to the live internet stream also participating via email.

If you missed it, the talk is available on the ARNSW Website under the VK2WI News Broadcast Link.

Another Year

The VK2WI News has returned to the morning and evening sessions after being morning-only operation across the holiday period. Peter VK2HC has, for many years, been one of the team at the morning broadcasts in an engineering role. He has now taken a break from this role and many thanks for his help with this task. Those interested in a role of Engineering or Announcing should make contact by an email to: *news@arnsw.org.au*

Photo: Dick Smith VK2DIK with Hanna and Lizzie VK2FLIZ at ARNSW (Paul VK2APA).

If propagation is poor or you are out of range of VK2WI, the news sessions are streamed via *www.arnsw.org.au/audio* They can also be listened to at any later time.

Late last year work commenced on the replacement mast for the VK2RWI repeaters at VK2WI Dural. The first activity was the construction of the concrete slab for the mast base. Next will be the erection of the concrete mast sections followed by the antenna installation. This installation is replacing the original triangular tower which is both showing its age and can no longer see over the trees.

The first major ARNSW activity for this new year is the regular bi-monthly Trash & Treasure on Sunday 27 January. On the same day at 12 noon, the Experimenters Group will hold their regular meeting, opening with a show and tell, following by a lecture. These days are always on the last Sunday of the odd numbered month: March, May, July, September and November. ARNSW provides a service to help dispose of unwanted Amateur equipment and Deceased Estates. The contact and inquiries for this is only by email to *disposals@arnsw.org.au* No telephone calls on this service. Check out conditions on the ARNSW web site *www.arnsw.org.au* One area of the hobby that is not handled is the dismantling of HF beam and towers. Such work should only be carried out by suitably qualified persons, who carry the required insurance and knowledge.

The Big Field Day at Wyong

The big annual field day event in VK2 is on Sunday 24 February, provided by the Central Coast ARC at the regular venue – the Wyong Racecourse. Check out their web site for the Field Day program. The Field Day organizers are seeking photos from the 60 plus years of previous field days. One of the activities on the day is the ability to sit an American Amateur licence exam. You can obtain details from the examination team at veexams.com

Autumn activities

Moving into March there is a lot of activity at ARNSW. Kicking off on Sunday 10 will be a Talk Fest – note

the date change from that given in the last issue of the *AR* magazine – with the theme of HF Antennas – intended mainly for the Foundation licensee but open to everybody. More details in the VK2WI News sessions and you can inquire or book by email to *events@arnsw.org.au* March 11 is the anniversary of the origin of ARNSW, formed in 1910 in Sydney. The first of the ARNSW Foundation weekends will be on 16 and 17 March. Make contact by email *education@arnsw.org.au* for either the Foundation course or assessments. Other Foundation weekends are scheduled in the odd numbered months, two weeks before the bi-monthly Trash & Treasure events.

The chief presenter for many years for both the Foundation weekends and the Upgrade course has been Paul VK2APA. Paul has stepped down from this position and headed north. Many thanks are extended to Paul for those long hours of teaching. There are thoughts being given to conduct an Upgrade course this year but there were no details available when these notes were being prepared.

At the end of the March there will be another Trash & Treasure and Experimenters gathering on Sunday 31. The ARNSW AGM has been set down for Saturday 13 April. The Library service from ARNSW is operated on late Monday afternoon and early evening, except on public holidays. Contact for them is *library@arnsw.org.au* Most ARNSW activities are shown on the 2019 magnetic calendar sent to members late last year.

In other news to hand St. George ARS have scheduled a Foundation weekend for 9 and 10 February. They also have their annual two metre simplex contest which continues until 28 February. Details at *www.sgars.org* WICEN NSW have a training day scheduled for 3 February and a field operation at Newnes on the weekend of 2 and 3 March. Mid year – June long weekend – is the annual two day field at Port Macquarie hosted by the Oxley Region ARC.

73 – Tim VK2ZTM.

Silent Key

Peter Stewart Walton VK6QK

Peter became silent key on Monday 29 September following a heart attack; he leaves his wife of 51 years Wendy, and two daughters Barbara and Lana and families.

Peter was a silent achiever in the true sense of the word, born in Leonora Western Australia in 1945 and attended Gwalia State School and Eastern Goldfields High School.

He gained an apprenticeship with the Sons of Gwalia Gold Mine and when this closed on 13 December 1963 he completed his apprenticeship at Great Boulder Mine in Kalgoorlie.

At this time, like many of his peers, he was called to do two years of National Service and was stationed with the Royal Australian Electrical Mechanical Engineers. Upon completion of his service he returned to Leonora and for a short time worked as an electrical contractor before moving to Perth and working for the State Electricity Company (SEC). He then moved to the Perth Agriculture Department before he decided to make a

change in his career and studied to become a trade lecturer.

He started at Fremantle TAFE teaching electrical apprentices, moved to Perth TAFE were he also got his refrigeration mechanic qualifications, so he could teach refrigeration electrics to refrigeration and air-conditioning apprentices. When TAFE built a specially designed unit for refrigeration and air conditioning mechanics at Carlisle campus, he moved to teach at this specialized campus. He also went on to teach computing at Bentley.

Peter was an active member of the Northern Corridor Radio Club and was a Net controller for the WASSTV group for a number of years and was always available to assist anyone that wanted to join in this mode.

He was also a pilot flying Glider aircraft in events all over Western Australia as a member of Beverley Soaring Club as well as a builder and racer of model radio controlled boats and yachts.

Peter achieved his Novice licence in 1976 with the call VK6NDW and then upgraded to the Advanced licence with call sign VK6QK and worked all modes including CW, HF, and QRP such as WSRP using Raspberry Pi low power equipment.

We will all miss you Peter, 73.

Tony VK6ATI

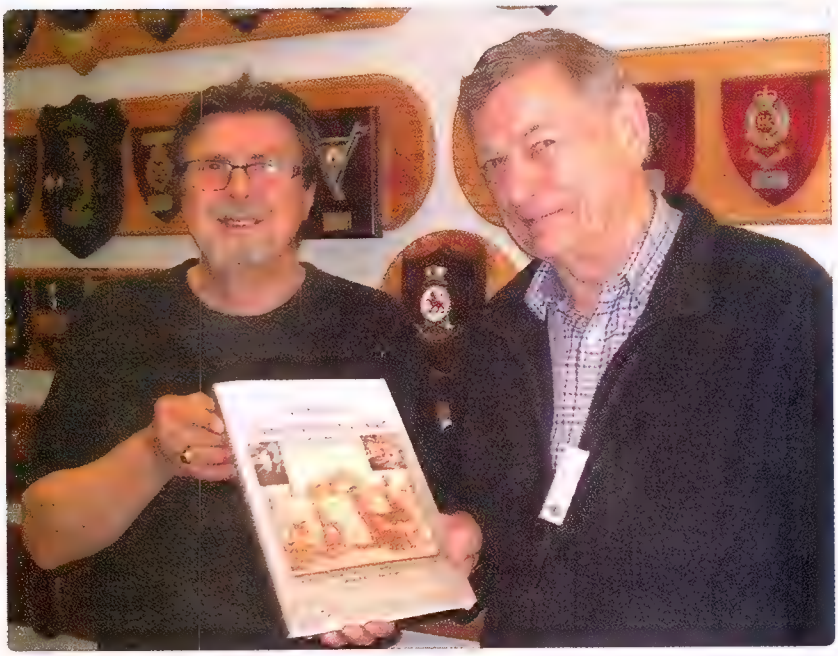
Net controller for the WASSTV group.

VK3news Macedon Ranges Amateur Radio Club

Peter Wolfenden VK3RV

Presentation to local RSL

At the December meeting of the Macedon Ranges Amateur Radio Club (Vic.), the Club President Joe Balassa VK3MAB presented a copy of the Wireless Men and Women at War book to the RSL Sub Branch in Woodend. MRARC was formed in 2010 and has been meeting at the RSL rooms for about seven years. Peter Whitelaw, President of the Woodend RSL, respectfully and gratefully accepted the book on behalf of the RSL. Two of the contributing authors for this WIA publication were also present: Jenny VK5ANW/VK3WQ and Peter VK3RV, both are foundation members of the MRARC.



Woodend RSL President Peter Whitelaw (L) receiving the book from MRARC President Joe Balassa VK3MAB.

Editor's comment: Other clubs should become involved with this sort of activity as many RSL clubs have members who are interested in radio communications. Wireless Men and Women at War *contains many human interest stories, not only about service personnel who were radio amateurs, but also equipment used and events which took place, particularly during WWI and WWII.*

If your club decides to become involved, take a photo of your club's presentation. Send a copy to AR and seek out the local newspaper, providing them with a copy of the photo and a short written report about the presentation and the fact that a local radio club is in the area which invites anyone interested in joining. You may wish to prepare a combined effort report for the newspaper with the RSL and gain some publicity for both your club and the RSL.

Information about the book can be found on the WIA website under For Members *and* WIA Bookshop *then* WIA Publications.

VK3news MDRC

Ron Cook VK3AFW

M&DRC 70th Anniversary Luncheon

On Saturday 15 December 2018, 29 members, past members, life members and friends attended a luncheon at the Bentleigh Club to celebrate the 70th anniversary of the beginning of the club. Club President Lee VK3GK and Ken VK3KIM Secretary and Vice-President provided a professional polish to the proceedings. Lee produced a continuous slide show of past members and their activities which was displayed on a very large screen.

A three course meal served on white linen with wine and soft drink, followed by tea or coffee was enjoyed by all.

Ken gave a well-researched summary of the earlier days of the Club.

The Moorabbin and District Radio Club evolved from weekly meetings during 1948 at Col Gibson's radio shop in Bentleigh by a few amateurs living in the area.

At its inception, it was determined that M&DRC would be affiliated with the WIA. After the Club was formalised, meetings were held in the Moorabbin Library and later in members' garages. From 1965 the Club met at the Moorabbin Baseball Clubrooms until the present accommodation in Turner Road Highett was built. M&DRC moved into the new Clubrooms in August 1976.

The club applied for a callsign and boldly requested VK3MRC, however this concept was beyond the ambit of the authorities of the day who were diligently doling out the "A" series of suffixes and we were allocated VK3APC. The advent of TV in 1956 caused a big drop in membership and amateur activity in general. AM transmissions often had sufficient harmonic output to mar local TV reception. Other operators were lured by the attractions on the small silver screen.

In time, band activity recovered with TVI prevention knowledge, harmonic-clean and affordable commercial transceivers and boredom with the standard TV fare. Soon afterwards Field Days, Fox Hunts and Contesting became popular and the Club received a number of awards for its efforts.

Harold Hepburn and a couple of other members produced a number of kits which were state of the art and affordable. These included an 80 m receiver, a 2 m convertor, a five band HF transceiver and a heavy duty regulated power supply. These projects became a steady income source for the Club with sales extending well beyond the membership. Indeed, Harold was a prolific designer and constructor and contributed numerous technical articles to *AR* magazine.

Group Photo 1: A: President Lee VK3GK addresses the gathering. B: Colin VK3UDC The Club Museum Officer. C: Jeff VK3VJS recounting past antics. D: VP Ken VK3KIM presenting a potted history of the Club. E: Leon VK3DTR talks about the early days.

The club commenced weekly broadcasts in January 1999, a favourite part of which was "Ham Sandwich". A written objection was lodged with the ACMA who asked for the broadcast to be pulled. However the Club was able to get the rules altered and the broadcasts resumed. They continued for over four years and totalled over 200 broadcasts. Sadly they have since lapsed.

At its peak, the Club had about 170 members and from the 1950s to the 1970s was one of a few organised Amateur Radio Clubs in Melbourne. It is the third oldest Club in Victoria. Now it is one of five clubs within 15 km of Moorabbin and so some dilution is to be expected.

Annual Trade Days commenced in the late 1970s and evolved from regular in-house auctions of members' surplus gear. They morphed into Hamfests and were a unique feature of M&DRC. Other clubs were invited and participated in the early ones.

As solid state devices started to predominate a Valve Bank was established. It filled a garage and was very successful for many years. The majority of the valves were given to a restoration group in 1996 and since then donations by members and friends has rejuvenated our stocks and now we have several hundred valves available for sale to members and friends.

Today the Club is active in supporting WICEN, Lighthouses on the Air, JOTA and SOTA. An informal group is experimenting with digital radios and mini-repeaters. We have also supported a primary school electronics program run by Joe VK3YSP and Julie VK3FOWL.

Those present were invited to tell stories from the early days.

Denis Babore VK3BGS recalled attending a JOTA event at Riddell's Creek and having a very successful time. Later he found that there were two Scout Groups in the area and they had set up their station at the wrong one. This did not affect relationships, as for successive years afterwards the Moorabbin Club operated JOTA at this Scout facility.

Leon VK3DTL recalled building a crystal set while living at Berriwillock in NW Victoria and erecting an external antenna for his aunt's broadcast band radio. Jeff VK3VJS talked about crystal sets and backyard to backyard self-powered telephones, buying old valve receivers – solid state was the way to go and good valve sets were being traded in – and being able to tune the short wave bands.

After being entertained with a number of other anecdotes, the celebratory event concluded with the promise of another celebration in 2019 marking the official formalisation of the Club.

VK3KIM and VK3AFW

Photo 2: Table 4 Brian VK3BCM, Alby SWL, Jeanette, Shane VK3FBMD, Emma, Peter VK3MV.

Photo 3: Sarah VK3SD, Jeff VK3VJS, Terry VK3YX, Col VK3UDC, Ben VK3FBCN, Ken VK3CEK.

Photo 4: Table 3 Leon, VK3DTL, Noel VK3BMU, Graeme VK3GL, Ian VK3SV, Roger VK3KYY.

Plan ahead

Operate within the band plans:
http://www.wia.org.au/members/bandplans/about/

VK6news

Steve Kennedy VK6SJ

Ham College

Ham College activities were completed for 2018 and we look forward to 2019 with a degree of uncertainty as to what will be happening in the field of amateur radio assessment. Despite this, the College will be continuing to provide education through courses at all levels from Foundation through to Advanced; by the time this note appears in the magazine we will already have run a Foundation weekend and started our Standard/ Advanced courses.

Last year the College conducted over 80 individual assessments, introduced over 20 new Foundation licensees and 12 each of Standard and Advanced promotions! Of course we also do large numbers of Regulations assessment as an important component of increasing privileges and responsibilities.

All of this requires volunteers and we are only a small group. So if you can help us by imparting your skills or becoming an invigilator/assessor or whatever title the successful tender for the ACMA contract uses, we would love to hear from you at: *www.hamcollege.com.au*

We meet on the second Tuesday of the month at 6 pm in the Lynwood Scout Hall inside the Whaleback Golf Course in Parkwood; if you need directions, just ask. We would love to see you at our meetings.

Andrew VK6AS enrolments officer on behalf of Kathi VK6KTS, President

Bunbury Radio Club

The Club's January meeting will be held on Saturday 12 January, beginning at 1400, at 21 Halsey Street, South Bunbury.

It's been a very quiet period for the club due to non-availability of our normal venue and the absence of several key members. So, there is not a lot to report.

Our December meeting was held at the Capel Tavern on a Wednesday evening. It was a productive meeting, no doubt assisted by the consumption of the local medication. The main topic of conversation was the progress on the upgrading of our repeater, VK6BRY. The plan is for it to be located higher up the hill on a taller tower. The expectation is that it will provide a greatly enhanced range.

There were two technical topics discussed. The first centres around the appropriate use of the RF gain control on a typical transceiver. The second was a discussion of antenna problems besetting one of our members.

Congratulations to Gavin Soulos for obtaining his Foundation licence VK6FGTS. Already Gavin has been active in Club matters and will be a stalwart member for some time to come. To kick off he has acquired an Icom IC-7300 and various antennas to get him on the air.

Any South West based amateur (or anyone interested in radio or electronics) is more than welcome to join and participate in our activities. Because so many of our members come from near and far we are evolving into a semi "virtual" club. Consequently, regular attendance at meetings is not a requisite for membership. The annual fee is only $50.00. Those wishing to join can contact the Club via our Secretary, Richard Ayre on 0439 940 253, or *vk6brc@wia.org.au* Further details can be found on our website at: *http://www.bunburyradioclub.com/*

Friday Night TechNet

TechNet started on a whim in Burlington, Ontario Canada over 14 years ago by Reg Bagshaw VE3BQQ (now also VK6BQQ) on 146.550 simplex. His first contact was the late Dave VE3DLK in Hamilton. Over 500 weeks later and still going strong, the net has become a Friday night ritual with an average of 50 or more check ins. Using the Internet via IRLP, EchoLink, E-mail and of course good old fashion RF radio. The Net initially ran as a Technical Net and as interest and support grew, we offered online emerging and support for those looking to upgrade from Basic to Advanced licence, with the help of Reg and his knowledge and experience from many years in the communications industry.

Several Local hams have done this, also thanks to the TechNet Team several amateurs have helped with tower erections, antenna installations, radio repairs and other technical problems. Today the Net has evolved more into a social gathering place for amateurs worldwide to meet and gain insight into what is happening in the world of amateur radio.

This year, the Friday night TechNet has reached a mile stone internationally. We have our own conference on EchoLink - techlink 9229. We have many conferences join in on a weekly basis, with an average of 40 different connections. In addition to TechNet, we have also started the flying pig net with an air accident investigator (retired) on board each week. We have three host net controllers; K5ESS from Texas, AF7JM from Washington and N4FOZ from Jacksonville Florida and as a backup for the net we have John VK3HJQ and KG4PXG from Georgia watching the connection in case of a problem.

This week coming up, 884 weeks on the air continues. We are hoping for something special for our 900 weeks. We have our own website on *QRZ.com* and a site on Yahoo.

Every week is different in that we never know where connections are coming from, which keeps the net interesting. We have the usual connections of course, but new ones join each week, as well as new amateurs.

More info can be found on *qrz.com* under the call VK6BQQ.

VHF Group

Within the time scale of this issue, we expect that the Peel Amateur Radio Group's Swap-Meet will have taken place and once again, the WA VHF Group will have been present offering a range of pre-loved items for sale. We generally have a good turn-out of members and expect this year to be no different, with the possible exception of trialling innovative ways to attract attention to our offerings!

During 2018 several members of the WA VHF group tried their hands at satellite communication through SO50, AO91 and AO92 primarily. We found that results were patchy and have been experimenting with a variety of antennas including double crossed dipoles, quadrifilar helix and Lindenblads. One member especially has an impressive array of Yagis with rotators, etc. and has continued success. Others aspire to use alternatives such as the aforementioned to broaden the scope of usable antenna configurations. More on this as the year unfolds.

The majority of our satellite-interested members use SDRs of various lineages, including the cheap-and-cheerfuls and some well-designed units such as RTL-SDR. Accordingly a bulk order was organised for the better RTL-SDR units, along with LNAs (specifically LNA4ALL) and with Christmas around the corner we are awaiting their arrival as this is written. Santa's tracking service offers no help though in locating our goods.

Activity on "the magic band" 6 m has been heating up towards the end of 2018, notably here in the West. Committee will consider how best to foster and support activity in this band. Keep an eye on the Club News section during 2019 to learn how that plays out. Important however to note that despite the VHF in our name, we do inhabit other bands as some results in contesting (John Moyle Memorial Field Days) and Scouting activities (JOTA) confirm. One member of our group subscribes to a 2200 m forum and regularly provides us with updates so look out for us on longer wavelengths, too. Quarter-wave vertical, anyone?

During the latter part of 2018 Group member Rick VK6RK, with commendable skills, constructed and tested our new flagship multi-mode, multi-band beacon.

We anticipate testing in the latter days of 2018 / early 2019 should prove it to be a sterling performer and we hope to be re-siting it for further commissioning and operation. One of our aims in 2019 and beyond is to rekindle our fleet of terrestrial beacons and see them sustainably deployed. We imagine that other Clubs also find the sustainability, not to mention the availability, of suitable beacon sites is declining. In the last quarter of 2018 for example we lost - through demolition - a commercial tower we'd been fortunate enough to employ for a number of years. The feelers are out but it is a slow process.

Importantly, during 2019 our good friends at the City of Melville, especially the Museums staff, will be working with us to mount a professionally-curated public exhibition of the development of wireless communications from 1900 to the present day, highlighting the contribution by Amateur Radio. Bob VK6KW has spearheaded this journey supported by many members of this and other Clubs in VK6. The significance of the site, Applecross Wireless Hill, cannot be underestimated. Aboriginal communities used the prominent site for their communications, long before the arrival of English, European and other settlers and this is celebrated in signage at the site.

Then came technology and, along with the now long defunct VK2-based shore station at Pennant Hills serving the East Coast, Post Office Perth (POP) materially assisted with maritime operations on the West Coast, first alone and then with a growing number of smaller coastal stations. During both World Wars, Wireless Hill operators provided vital communications to Naval and merchant vessels. Sydney's Pennant Hills station is all but invisible - at Wireless Hill we are fortunate to have the main buildings, the guy towers and other artefacts. So it makes great sense to stage an exhibition for communication here. Amateurs and professional engineers such as WA's Wally Coxon and Don Graham as well as Victoria-born Alf Traeger of pedal radio fame among many others, have an essential place in communication and Amateur history that deserves to be acknowledged. We look forward to providing updates and any Amateurs who have memories to share of those times, examples of home-brew or first-of-its-kind rigs, QSL cards, photos... please be in touch!

We have been pleased to participate in several AR contests throughout the year and while suitable sites for events such as VHF / UHF Field Days are being slowly built out, none the less, we are enthusiastic about continuing to be involved in contesting of some form or other through the coming year. Ours has been a very social focus and we've been fortunate that our actual scores have in the main reflected our enjoyment. The same can be said of supporting the Scouts in JOTA / JOTI - our enjoyment and satisfaction has been mirrored by the Scouts themselves, despite sometimes "11th hour" requests for assistance to support outlying campsites!

In closing I would say that during 2019 we will explore ways to grow our membership. The Amateur population is increasing if

the reports from Ham College and NCRG are any guide and we'd like to offer our welcome to any operator, newly-licensed or not, or SWL. Certainly look out for our reports in forthcoming *AR* Magazine issues.

73

Denis VK6AKR

Vice President, WA VHF Group

Northern Corridor Radio Group

We finally erected our 4-square vertical array for 80 m, with an elevated earth grid (6 m off the ground). We had used a single vertical on 80 m originally for a couple of years and it worked very well. This project had been run by Arthur VK6CY. Unfortunately, after three weekends of work by many in the club, a kangaroo ran into one of the verticals and brought it down and just to make sure, the annual May storm brought down the rest. At this point, none of us had the heart to start again. Arthur went walkabout to lick his wounds and we all thought about nicer things like new towers and bigger antennas.

The same May storm that brought down our 4-square array, also brought down our 15 m monoband Yagi and mast as well as significantly damaging our 40 m monoband Yagi. This precipitated a couple of months of robust discussion on the replacement of the mast and the 15 m capability. We had installed a SteppIR for our remote station and this had been used during contests very successfully, so we had eventually decided to purchase a UB 04EL-640 Yagi with 3 elements on 40 & 30 m and 4 elements on all bands from 6 to 20 m. This was installed on the tower that had housed our 40 m monoband Yagi.

Funny story with the new station: We received an email from a W5 ham voicing his displeasure over us not using the prefix W7 in front of our VK6NC callsign given that we were 40 dB over 9 into his station on 40 m and that he heard we were a remotely operated station from WA (that is Washington state isn't it?). We responded with the fact that WA is also Western Australia hence why we weren't signing W7/VK6NC.

Masts have been a big discussion point since the demise of the 15 m Yagi mast and are ongoing. We own a couple of very heavy-duty Collins masts that were built to support and rotate a couple of Collins Log Periodic Arrays – similar to the one down at Karrakatta and Pearce. This is one of our options but probably needs some additional real estate to install. Our quandary is how to find a balance between building masts to last the life of the club, without sending us all broke. More on this next year.

We commissioned our remote station this year and this has been one of the best used of our club assets. The station consists of a SteppIR 3 element Yagi for 40-6 m, IC-7300 transceiver, Green Herron rotator and SPE amplifier which merely coasts along at 400 W. Control of the station is via the Remote Hams web site.

Keith VK6KB and his project team have been building a 10 GHz EME station based on a Sea-Tel Shipboard tracking 2.1 m dish system, fed with a 100 W Siemens CWT amplifier, and driven by a Kuhne 200 mW transverter. The transverter will be driven from an IC-910 on 2 m. We have been building a completely new tracking system, based on a VK5DJ controller. The antenna is about to be installed on top of the training room. This station will probably be the best EME station in WA.

We used a similar structure for Hamfest this year with a social event run by the Team at News West on the Friday night, which was a fantastic night and attended by a good number of non-NCRG members which was great to see. We held our second Tech day at the NCRG premises which were also well attended. We had a live presentation on Flex Radio, on the EME station controller, the NCRG remote station, on the issue of Smith charts and also on the possibilities and principles of simulcast networks and how we might use that in Perth to merge the coverage of multiple repeater sites. We ran our annual Hamfest function, again at the Cyril Jackson Community Hall in Ashfield. This was again well attended and continues to be one of the largest events on the VK6 ham calendar although we see a number of other events hot on our tails! Great to see.

While we managed to miss both the RD and CQWW contests this year, due to either capital works programs or just plain old fatigue, we participated in the Oceania DX contest again and gave a good account of ourselves. We think we have at least a top 5 score. Next year we hope to break the record we set in 2017 at the RD and light up the ionosphere during the 2019 CQWW and Oceania contests. We also participated in the ARRL 10 m contest, making just over 200 contacts for the 48 hours. Conditions were poor with no Stateside or European openings.

NCRG and its membership were heavily involved in JOTA this year. Members were distributed from Two Rocks to Belmont this year, as well as Glynn VK6PAW doing a roving station from his car. We hosted the Ellenbrook Scouts at the club station and Steve VK6SJ representing the club with the Girl Guides at Guide House in Belmont and Stu VK6BG running a station at Two Rocks for the Scouts up there.

This year we started running training courses for all classes of licenses, run by Cedrick and Phil which have been very successful and assisted in lightening the burden on Ham College. What has been very pleasing has been the sharing of examiner resources between Ham College and NCRG (in both directions).

Our last organised function for the year was our annual Christmas party. Around 20 members attended the function at the club. Good wine, a bit of radio, lots of tall stories told (except for mine – mine are all true of course).

VK4news BARC

Les Neilson VK4FAEB

BARC Antenna Tower commissioned 22nd September 2018

BARC members and management are quietly impressed with the successful installation of our new Antenna Tower. It has taken BARC members around 12 months from the initial decision to accept the offer of an antenna mast to having it up and working.

Our repeater masts around the site have changed a few times in the last two years with differing results for members and it was clear we still needed a better solution.

We first inspected the mast in September 2017 at the Manly Trailer Boat Club where the "Marine Radio Moreton Bay" had its shack. They had since moved location to the Royal Qld Yacht Squadron just down the road and did not want the mast anymore? Could we use it?

Well what can you say; we could! But the logistics of getting it down, moved and erected at Rochedale Club shack was largely underestimated by us and isn't that nearly always the case.

We had it lifted out by crane and set down in the car park, where we disassembled it on site and moved it to the club house by large trailer in several loads.

The tower was slowly reassembled beside the new site incorporating new high tensile bolts in the steel pieces and installing off-takes that would jut out from the mast holding our new antennas.

Firstly we had to pour a concrete base to hold it securely, and we did that by assembling the base section of the mast and moved that into position over the excavated base site and suspended it over the pit. Boxing was constructed, reinforcement laid and the concrete was poured and yes we had enough, even too much and so some of this had to be turned quickly into making some paths with what was left over, but that turned into a bonus too.

Photo 1: Overview of the Club mast.

Construction continued until the entire tower was completed and cabling trays were fixed up the length of the tower and a new ladder system installed enabling an easier climb to the top. We added a 6 metre pole at the top which took the total height to around 23 metres and mounted our 70 cm repeater antenna to it. Our 2 metre repeater was mounted around 15 metres in height.

We have a further three antennas mounted two 2 metre antennas, one for our Parrot recording repeater and a triband 70 cm, 2 m and 6 m that we want to use for our second antenna outlet on the all band radios.

Initial radio tests indicate greater clarity and power for most members and a big welcome back to our lost 70 cm net members.

We have yet to test its distance limitations but I could easily hear the ident on both repeaters in Boonah some 100 km away on my mobile radio which doesn't have great reception or transmission capabilities.

Have a great Day.

Les Neilson VK4LEZ
Rochedale Sth Qld
BARC President

Photo 2: The mast whilst under construction.

VHF/UHF - An Expanding World

David K Minchin VK5KK

Introduction

This month we have a summary of Tropo DX conditions in VK/ZL late December 2018 as well as a report from Rex VK7MO on his VK4 EME DXpedition. Also more on experiments on 122 GHz to extend the VK record and Kevin VK4UH's ever popular Meteor Scatter notes.

Tropo returns just in time for Christmas!

Perhaps this year's season crept up on us but nothing better than a Tropo season that arrives just in time for the Christmas/New Year break! Whilst the run up to this year's season was a bit erratic weather-wise, the more typical summer pattern of High pressure cells in Southern VK with moisture feeds (troughs) from the north started to settle mid December 2018. The photos of the Hepburn Tropo Index and the BOM Synoptic Chart from 2/1/2019 show the typical patterns evident on both the Australian Bight and Tasman paths for late December 2018.

The emergence of these relatively stable systems resulted in a number of Tropo openings on 144 MHz and 432 MHz in the Mid East and South East areas of VK with typical distances out to +1,000 km. Mixed in with all this was good 50 MHz Sporadic E conditions with the MUF rising to 144 MHz to enable contacts between VK3/5 and VK4 around 27 December.

As these systems drifted into the Tasman Sea, Tropo extended from VK2, 3, 4, 5&7 to ZL (North and South Island) with peaks around 14/12/2018, 25/12/2018 and 1/1/2019. A summary of the longer distances (courtesy of the VK Logger) for 144MHz and 432 MHz contacts achieved can be seen in Figure 3. Unfortunately there has been little activity across the Australian Bight to VK6 from

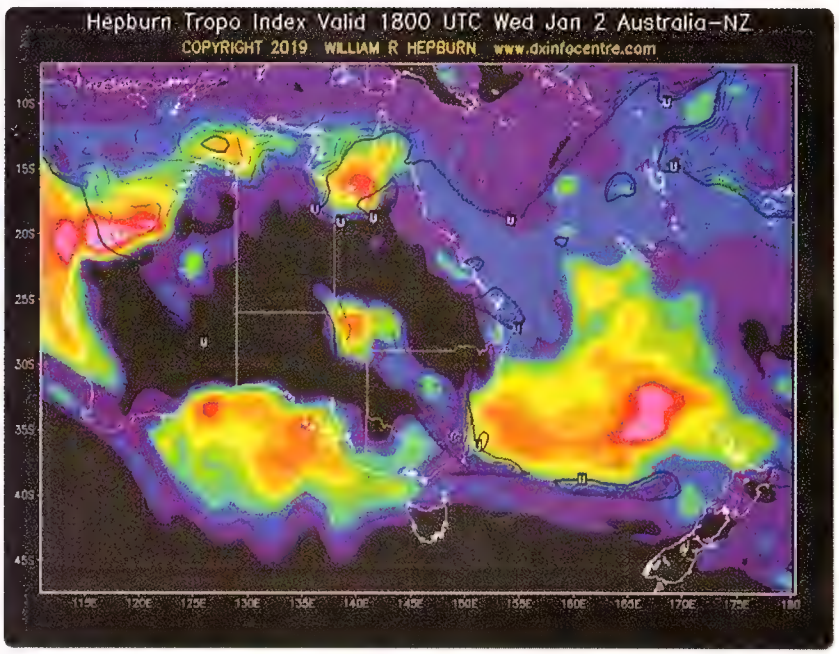


Figure 1: Hepburn Tropo Chart 2/1/2019.

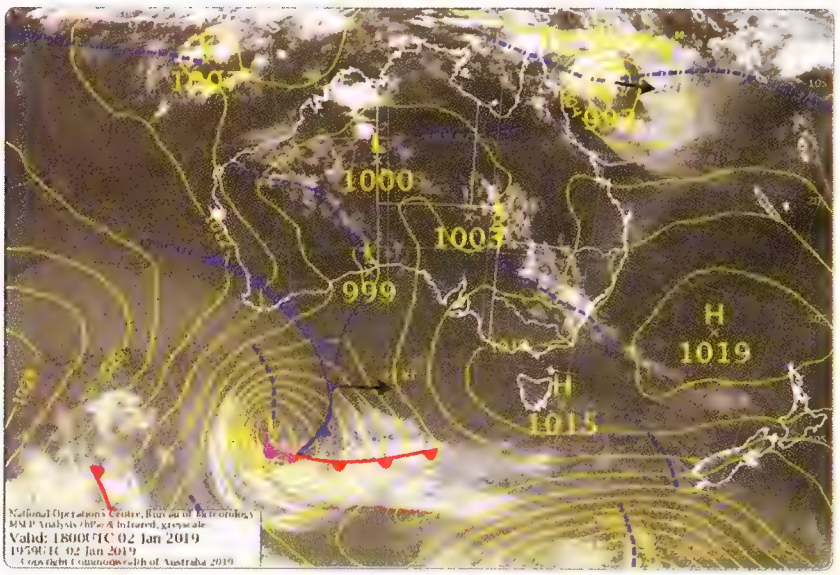


Figure 2: BOM Synoptic Chart 2/1/2019.

144 MHZ SSB Contacts 20/12/2018 - 2/1/2019

Date	UTC	From	SPOT/Message	Frequency	Mode	RST	Distance (km)
01-Jan-19	00:53	VK5DK in QF02JE	ZL3MH in RE66GJ	144.100000	SSB	55	2742.8
01-Jan-19	00:56	ZL3MH in RE66GJ	VK5DK VK5DK 53 my end FT101zd MK3 FTV250 Transverter Built 1976 125w Drawa amp 10 element beam feed all the way with hardline coax	144.100000	SSB	53	2742.8
01-Jan-19	02:08	VK5DK in QF02JE	ZL3MH in RE66GJ Murray I am running 400w to a solid state amp using 2 x 13 element yagis & using an IC748 receiver with built in VK5 pre amp	144.100000	SSB	55	2742.8
01-Jan-19	00:59	VK3ZAZ/P in QF02WH	ZL3MH in RE66GJ happy new year tnks qso as VK3OT 73	144.100000	SSB	53	2861.7
26-Dec-18	03:04	VK3ALZ in QF31FS	ZL1IU in RF64VR	144.100000	SSB	51	2453.9
26-Dec-18	09:22	VK3VFO in QF31FS	ZL1RQ in RF64SX	144.125000	SSB	59	2439.2
26-Dec-18	09:09	ZL1RQ in RF64SX	VK3WRE in QF31GT	144.100000	SSB	51	2434.0
31-Dec-18	21:05	VK2XW in QG50VI	ZL1AKW in RF82CG	144.100000	SSB	57	2422.1
26-Dec-18	00:54	VK3ZYC in QF31NT	ZL1IU in RF64VR Nice signal nick solid signal HNY	144.100000	SSB	57	2398.8
31-Dec-18	21:26	VK2BCC in QF56DI	ZL1AKW in RF82CG	144.100000	SSB	59	2379.1
01-Jan-19	20:54	VK2BCC in QF56DI	ZL1IU in RE79VR	144.100000	SSB	57	2378.3
31-Dec-18	22:34	VK2VL in QG60LE	ZL4DK in RE54EC	144.100000	SSB	53	2342.4
25-Dec-18	19:53	VK3DUT in QF32VF	ZL1IU in RF64VR just a whisper on 70, may peak bit later, enjoy ur BBQ !	144.100000	SSB	59	2334.0

432 MHZ SSB Contacts 20/12/2018 - 2/1/2019

Date	UTC	From	SPOT/Message	Frequency	Mode	RST	Distance (km)
25-Dec-18	21:49	VK3DUT in QF32VF	ZL1IU in RF64VR tnx for 5x1 Nick, 23cm next !	432.150000	SSB	52	2334.0
30-Dec-18	09:44	VK2ZT in QF57WF	ZL2WHO/B in RE79VR	432.271000	SSB	53	2290.1
02-Jan-19	02:17	VK2MAX in QF68JV	ZL1AKW in RF82CG 5x8 on 144.100 tnx dave	432.150000	SSB	51	2264.8
26-Dec-18	03:45	VK4UH in QG62KP	ZL1IU in RF64VR	432.100000	SSB	51	2171.2
26-Dec-18	07:06	VK4CZ in QG62LP	ZL1IU in RF64VR	432.150000	SSB	41	2167.1
30-Dec-18	09:46	VK4UH in QG62KP	ZL1RQ in RF64SX	432.150000	SSB	53	2139.2
25-Dec-18	19:49	VK2DO in QF54CH	ZL1IU in RF64VR Thanks for taking time away from the BBQ Nick, tremendous signal on 2mx as well 73	432.150000	SSB	55	2135.1
26-Dec-18	04:30	VK2DO in QF54CH	ZL1IU in RF64VR Duct as strong as ever, signals on 2mx described by Nick as obscenely strong!, like 80mx	432.150000	SSB	59	2135.1
26-Dec-18	20:27	VK2DO in QF54CH	ZL1IU in RF64VR Like a perennial pipeline Nick, 5x9 on 144.200, signal on 70 not nearly as good as yesterday, but still feasible.	432.150000	SSB	59	2135.1
29-Dec-18	19:25	VK2DO in QF54CH	ZL1IU in RF64VR Good to see two bands being supported Nick, 5x9 on 2mx, not nearly as strong as Boxing day	432.150000	SSB	52	2135.1
02-Jan-19	05:35	VK2DO in QF54CH	ZL1IU in RF64VR No sign of signals so far on 23cm, S9 on 2mx	432.150000	SSB	55	2135.1
27-Dec-18	03:56	ZL1RQ in RF64SX	VK2ELH in QG61JC	432.150000	SSB	55	2099.5

Figure 3: 144/432 MHz Long distance SSB Late December 2018.

the Eastern states so far. Derek VK6DZ's WSPR signal on 144/432 MHz has been absent since the storm damage done to his antenna system. As of 2/1/2019, indicators are such that this is just the start; let's hope we see some Tropo on higher bands as well!

VK7MO Roving 3 cm EME Grid Tour of VK4

Rex VK7MO reports... *"A total of 22 new grid locators were activated between 20 May and 26 June as shown in Green on OK1KIRs web Map at Figure 4. QG62 had been previously activated but was again activated for a demonstration of portable EME at the Wireless institute of Australia Annual General Meeting. A key achievement was the activation of QH19 (Fig 3), the most Northerly grid in Australia, which involved a round trip of some 1400 km on mainly rough dirt, and much of the time badly corrugated, roads. Typically around six stations completed QSOs at each grid with a maximum of eight. In some situations there was no access to the internet and stations were worked random. Text messaging via EME proved useful to provide information on plans when the internet was not available. Stations who participated were W5LUA, VK3NX, UR5LX, OK1KIR, OK2AQ, OK1DFC, OK1CA, HB9Q, OZ1LPR, G3WDG, HA/G3WDG, and UN6PD. A total of 140 QSOs were completed. A difficult issue was to operate both Moon Rise to North America and Moon Set to Europe and to find accommodation at each site with suitable take-offs. Nevertheless all stations that were available were worked at each grid. In some cases the only suitable accommodation meant sleeping in the car."*

"VK7MO used a new portable system based on a 95 watt GaN SSPA and a 1.13 metre dish with linear Horizontal polarization. All operations were with the QRA64-D mode in WSJT-X with CFOM or Constant Frequency On the Moon. A big advantage of CFOM is that all stations can tune to the same frequency and copy all activity without retuning. The smallest stations worked were OK2AQ, 1.2 metre dish and 40 watts, HA/G3WDG, 1.2 metre dish and 50 watts and UR5LX, 2.4 metre dish and 20 watts (10 Watts at QH24 due to PA overheating). These three small stations completed under even poor conditions of libration spreading over 100 Hz and Lunar degradation up to 1.5 dB. From these tests it is concluded that two portable stations using 1.2 metre or 4 foot dishes and 50 watts can reliably work each other under even the worst conditions of spreading and lunar degradation, providing one of the stations can adjust polarization to correct for spatial offset. While some may argue that the solution is circular polarization there are good reasons for small 3 cm EME stations to use linear polarization. These include less blockage of small dishes to switch from clockwise to anticlockwise circular, the fact that small portable stations are also used for terrestrial and as G3WDG has noted there is a performance advantage of around 1 dB."

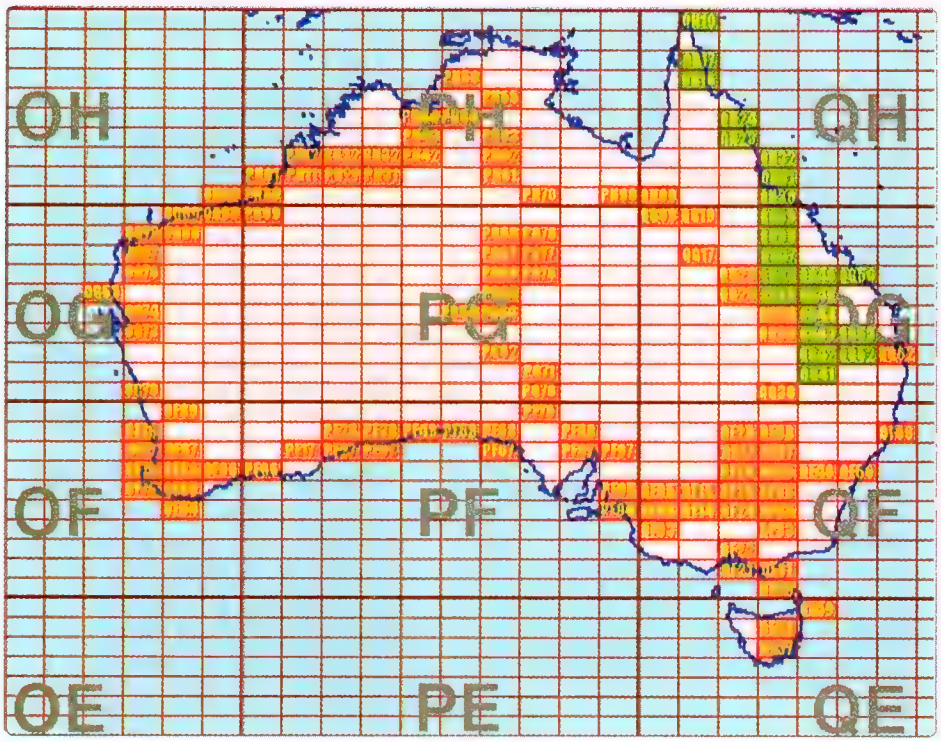


Figure 4: OK1KIRs Web Map showing 3 cm Digital EME QSOs in VK with the new grids activated in green.

Single Tone Identification

"A useful technique that was adopted for the Dxpedition was to assign single tone frequencies to participants (see Figure 2). In the example at Figure 2 one can see single tones at 600 Hz from OK1KIR, 800 Hz from HB9Q and a much weaker single tone at 2000 Hz from the smallest station OK2AQ. These three stations started calling as soon as the Moon rose in Europe. The tones are assigned outside the QRA64-D working frequency of 1000 to 1900 Hz to so they don't affect on-going QSOs. In this way the DXpedition station is aware which stations have the Moon and can immediately call them one at a time, without the problem of having a number of stations call on top of each other on the QSO frequency. In this case as soon as the 600 Hz tone was seen, VK7MO called OK1KIR and you can see they responded with a message between 1000 Hz and 1900 Hz. The tones from HB9Q and OK2AQ continued indicating that they still had the Moon and were ready to be called. Another advantage of single tone identification is that it is several dB more sensitive and for instance OK2AQ would not have been decoded or visible if he was calling under one of the stronger stations. Stations not assigned single tone frequencies can still work the DXpedition but have to wait for a CQ call."

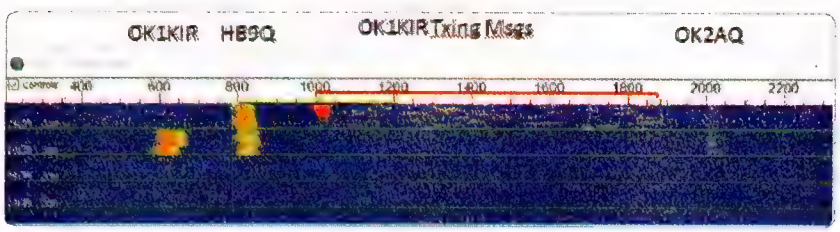


Figure 5: Use of Single tone identification on 10 GHz EME.

Operating in QH19 is not without its dangers!

"Operating Location at QH19, the most Northerly Grid locator on the Australian mainland was not without its dangers, see the warning in Photo 7 just 20 metres from this spot! It was necessary to operate this close to the water to get a good take-off to both Moon Rise and Moon Set and to operate the dish manually in the dark."

Australian 122 GHz record extended... again!

122 GHz is an interesting band to experiment with as it has everything going against it. Attenuation over any path is limited by both Oxygen and Water vapour absorption with a typical loss of 3 dB per km being the norm. The best paths are high altitude (less oxygen) at sub-zero degrees C (no moisture). So in Australia we have no real chance of bettering what can be done in Europe!

There are no (affordable) amplifiers available for 122 GHz. We use single ended diode Tripler/mixers so receiver performance is ~30 dB noise figure (actual DB6NT measurement in 2015). SSB TX mixing using the same arrangement results in power levels in the region of 10 – 20 uW although using the same diode as a Tripler will result in a few 100 uW of RF at 122 GHz (CW or FM modulated). If you are lucky enough to find a 61 GHz amplifier it is possible to improve performance by constructing a sub harmonic mixer. DB6NT claims an improvement of 8 - 10 dB in Noise Figure and SSB output >100 uW, good for a few more kilometres at least!

Waveguide (WR-8) for this frequency is hard to obtain even in Europe as legacy supplies dry up. As the wavelength is just 2.5 mm a simple alternative we use is hobby

Photo 1: VK7MO's Location at QH19, the most Northerly Grid locator on VK.

Photo 2: Warning about operating close to the water at QH19!!

brass tubing but that presents other issues in avoiding polarisation change! As waveguide losses can easily run into several dB for just 100 mm the less waveguide used the better anyway. Our friends in Europe often just mount the mixer at the feedpoint to minimise the problem.

The only area left to improve is antenna gain however the 2.5 mm wavelength means antenna reflector accuracy needs to be 100 um or better. The importance of such precision cannot be understated; the current 132 km 122 GHz world record used 1200 mm (OE5VRL) and 400mm (OE4WOG) dishes that were machined in a lathe to 10um accuracy! In 2016 I managed to work OE4WOG (Wolfgang was using the same equipment as used for the record) from Schafbergspitze over 24 km with my DL2AM mixer, 250 mm Procom dish and simple splash plate feed. With some guesstimation on losses on that path, my antenna was probably 6 - 10 dB short of being optimum regardless of any difference in mixer performance.

In the search for a better antenna I dragged out a surplus 28 GHz "SpectrPoint CPE" offset dish. These dishes seem to have found their way onto the surplus market in a few countries, locally a pallet load of these appeared in VK3 some years ago from a failed installation. The geometry of the 320 mm wide dish is a bit oddball with a ~12 deg offset angle which places the feed point partially in the main beamwidth. The original feed had a slightly oval pattern so the H plane beamwidth was wider than the E plane (hence the feed blockage was of a lesser issue). Previous (successful) experiments on 47 GHz had established the most probable location of the feed point and the odd offset angle. Most likely it was a compromise design on its original frequency but as the dish surface is cast alloy with excellent surface accuracy/stability it was felt it was worth a try on 122 GHz!

The arrangement of the dish and odd angles can been from the photos. The original Procom 250 mm system can be seen in the background. The feed is simply the DL2AM diode mixer mounted at the calculated (not yet optimised) focal point.

The sighting scope is mandatory as there is absolutely no way to align the elevation of the offset dish with the odd offset angle. As a sanity check, scopes are aligned before each outing!

The first tests were done over the previous 8.0 km path on 7/11/2018 followed by a longer contact over 13.1 km at 0640 UTC, VK5KK/P to VK5ZD/P 519 both ways, setting a new VK record. Initial (rough) comparison on receive vs the original Procom system over 8 km showed a few dB improvement. As always there is plenty of room to improve things.

In closing

Feel free to drop me a line if you

Photo 3: VK5KK's 122 GHz Offset Dish System with GPS locking.

Photo 4: Close up of 122 GHz Feed and Offset Angle.

have something to report. Contributions regarding club projects or proposed activities are always welcome. Just email me at *david@vk5kk.com* and I'll include in the column.

73

David VK5KK

Meteor Scatter Report

Dr Kevin Johnston VK4UH

This edition: Version 2.0 MSK144/FT8 software released, Loss of VK-Logger (End of Life), Activity report for December.

The New Year 2019 is upon us. A number of important events, relevant to meteor scatter operation, occurred over the Christmas and New Year's holiday season just passed, some good and some not.

Firstly, the much-anticipated release of the "NEW" version 2.0 upgrade of the MSK144 and FT8 modes, in both the WSJT-x and MSHV platforms, occurred in December 2018. As was outlined in the last column notes, the new versions (version 2.0) of both modes involved the adoption of a 77-bit information payload replacing the previous standard 72 or 75-bit protocols. As such the new versions of both modes are not backward compatible and cannot be used for decoding signals generated in older versions of software. The latest version WSJT-x (2.0.0), from the internationally based software development panel, was released on 10 December, 2018 with the intention that the new protocols should become the word-wide standard and that all users around the world would upgrade to WSJT-x before 1 January 2019 and that after that date only the new FT8 and MSK144 should be used on air. Many trial versions of software had embedded changeover dates and would not boot-up after the release date, thus ensuring that the latest version was downloaded. There was the inevitable period of mayhem on air during the early phase of the changeover. On FT8 mode, on both HF and 6 m, the total incompatibility between the two versions was immediately apparent with considerable confusion and frustration between stations running old and new versions. However, it was possible to observe on-air stations from all around the globe downloading and adopting the new version over just a few days. By the end of December 2018, even on 20 m, it became very rare to find any stations persisting with the old versions of the software.

Likewise, the transition in VK-ZL to the 77-bit version 2.0 of MSK144 for

Meteor Scatter operation occurred over just a few days. By the end of December, assisted by good propagation of information around the MS community, most operators were made aware of the target implementation date and adopted Version 2.0 in quick order. So, at the time of writing, MSK144 version 2.0, 15 second periods had become our de-facto standard for Meteor Scatter Operation, within VK and ZL, on both 2 m and 6 m. There have been a few issues reported where the NEW versions were not running well, or not at all, on very old PCs still using redundant or heirloom Operating Systems. Everything needs to be replaced eventually and change remains inevitable.

Also in December, an updated version of MSHV (ver. 2.07) was released. Created by LZ2HV, while acknowledging the origin of the source code and protocols from the WSJT Development group, this platform represents an alternative to WSJT-X condensed down specifically for ease of use for Meteor Scatter and other digital modes. This updated version of MSHV also adopts the 77-bit Version 2.0 of MSK144.

The place of the alternative meteor Scatter mode JTMS, still only available in MSHV and not as yet upgraded to a 77-bit version, has slipped even further down the popularity stakes at the time of writing. From the author's point of view this is unlikely to be the end of the development line; more development will almost certainly occur with time. It's a matter of watching this space.

Any MS stations that are yet to upgrade to version 2.0 are urged to do so at their earliest opportunity. The websites for the free software upgrades and supporting documentation are given at the end of this article. Be aware that in most cases the NEW download will default to overwriting the existing versions.

On a less enthusiastic note it was also announced in December that the VK-logger facility was approaching "End of Life". There will be few serious Meteor Scatter operators, along with most others on VHF and above, within the VK-ZL community who have not made regular use of this resource to some degree. This author admits that it is rare for him to be on-air these days without the logger running in the background. Having been run on our behalf by Adam VK4GHZ for many years, this amazing resource will shortly be discontinued in its present form. The existing software platform is hugely out-of-date and has been patched apparently to within an inch of its life. There is a need for a complete ground-up replacement and the current creator has advised that it will be for others to achieve this goal. Firstly, I wish to offer my thanks to Adam VK4GHZ for his years of dedicated support in maintaining this resource and second a call for an individual or group to take over this role and create "LOGGER-2" for the community. I wish I had the skill-set to offer to achieve this – I regret I don't. But do you?

Lastly this month, a report on recent MS activity. As this was being written the 2018 Summer Es and Tropo season was starting to heat up over the holiday season. Normally this period of the year is mirrored by enhancement of Meteor Scatter propagation as well, as the earth tilts its summer side towards the sun. This season however, the normal improvement in MS propagation, even on 50 MHz, has been painfully slow to develop and the number of stations participating in the weekend activity sessions has been in decline. This double negative of reduced stations on-air and poor propagation becomes a self-fulfilling prophecy. Let's all use the opportunity to try out the new 77-bit software as the excuse to get back on air during the Saturday and Sunday morning operating sessions and reverse the current trend.

The next major showers on the calendar will be the Quadrantids shower peaking around 4 January 2019 (Class-1 shower, ZHR 120 meteors/hour) and then Lyrids shower peaking around 23 April 2019 (Class-1 Shower, ZHR up to 90 meteors /hour).

Activity Sessions

The weekend activity sessions run on Saturday and Sunday mornings from before dawn (around 20:00 UTC or earlier) until propagation fails.

Frequencies: 2 m 144.230 MHz, 6 m 50.230 MHz Current Preferred Mode MSK144 Version 2.0 15 second periods.

Southerly stations running 1st period beaming North, Northerly stations running 2nd period beaming south.

Register with VK-ZL Meteor Scatter Facebook Page (Closed group of AR operators) for up to the minute advice and information.

Version 2.0 software upgrades can be downloaded from:
https://physics.princeton.edu/pulsar/k1jt/wsjtx.html

lz2hv.org/mshv

or google WSJTx or MSHV for the websites.

Contributions for this column are as always welcome. Please e-mail to: *vk4uh@wia.or.au*

Kevin Johnston VK4UH
Brisbane

Plan ahead

Summer VHF/UHF Field Day 12 - 13 January 2019

Find the Rules at:
http://www.wia.org.au/members/contests/vhfuhf/

John Moyle Field Day Contest 2019

Denis Johnstone (VK4AE/VK3ZUX)

16 - 17 March, 2019

0100 UTC Sat - 0059 Sun

I wish all entrants good luck, and look forward to hearing some of you on air during the contest!

N.B. new email address: *jmfd2019@wia.org.au* will be set up close to the event for entries and you can check out latest info at *http://www.wia.org.au/contests/*

Overview

1. The aim is to encourage and provide familiarisation with portable operation, and provide training for emergency situations. The rules are therefore designed to encourage field and portable operation.
2. The contest takes place on the third full weekend in March each year, and runs from 0100 UTC Saturday to 0059 UTC Sunday, 16 - 17 March, 2019.
3. The contest is open to all VK, ZL and P2 stations. Other stations are welcome to participate, but can only claim points for contacts with VK, ZL and P2 stations.
4. Single operator portable entries shall consist of ONE choice from each of the following (e.g. 6 hour, portable, phone, VHF/UHF):
   a. 24 or 6 hour;
   b. Phone, CW, Digital or All modes;
   c. HF, VHF/UHF or All Bands.
5. Multi-operator portable entries shall consist of ONE choice from each of the following (e.g. 24 hour, portable, phone, VHF/UHF):
   a. 24 or 6 hour;
   b. Phone, CW, Digital or All modes;
   c. HF, VHF/UHF or All Bands.
6. Home and SWL entries shall consist of ONE choice from each of the following (e.g. 24 hour, portable, phone, VHF/UHF):
   a. 24 or 6 hour;
   b. All modes;
   c. HF, VHF/UHF or All Bands.

   Multi operator stations are NOT permitted in the Home Category.

   If a Home Station works the same station regularly on any band or any mode they should submit their log to verify those contacts. (See sect. 18 below.)

Scoring

7. Portable HF stations shall score 2 points per QSO. CW only contacts to score 4 points per QSO for contacts with either home or portable stations.
8. On VHF/UHF portable stations for Phone and Digital each contact scores 2 points per contact, and CW contacts score 4 points. In addition the VHF/UHF Portable stations shall add a distance score of the following on 6 m:
   a. 0-49 km, 2 points per QSO;
   b. 50-99 km, 5 points per QSO;
   c. 100-149 km 10 points per QSO;
   d. 150-299 km 20 points per QSO;
   e. 300-499 km 30 points per QSO;
   f. 500 km and greater, 2 points per QSO.
9. Portable stations shall add an additional distance score on 144 MHz and higher:
   a. 0 to 49 km, 2 points per QSO;
   b. 50 to 99 km, 5 points per QSO;
   c. 100 to 149 km, 10 points per QSO;
   d. 150 to 299 km, 20 points per QSO.
   e. 300 km and greater, 30 points per QSO.
10. For each VHF/UHF QSO where more than 2 points are claimed, both the latitude and longitude of the station contacted or other satisfactory proof of distance such as the 6-figure Maidenhead Locator must be supplied.
11. Home stations shall score:
    a. Two points per QSO with each portable station.
    b. One point per QSO with other home stations.
    c. For VHF/UHF QSO Home stations shall add as a distance score on 6 m:
       i. 0-49 km, 1 points per QSO;
       ii. 50-99 km, 2 points per QSO;
       iii. 100-149 km 5 points per QSO;
       iv. 150-299 km 10 points per QSO;
       v. 300-499 km 15 points per QSO;
       vi. 500 km and greater, 2 points per QSO.
    d. Home stations shall add as a distance score on 144 MHz and higher:
       i. 0 to 49 km, 1 points per QSO;
       ii. 50 to 99 km, 2 points per QSO;
       iii. 100 to 149 km, 5 points per QSO;
       iv. 150 to 299 km, 10 points per QSO.
       v. 300 km and greater, 15 points per QSO.

Log Submission

12. For each contact: UTC time, frequency, station worked, RST/serial numbers sent/received and claimed score. (VHF and above location of other station

and distance showing the Lat/Long or Maidenhead Locator to 6 figures for the station worked.)

13. All logs must be accompanied by a summary sheet showing: call sign, name, mailing address, section entered, number of contacts, claimed score, location of the station during the contest, and equipment used, and a signed declaration stating "I hereby declare that this station was operated in accordance with the rules and spirit of the contest and that the contest manager's decision will be accepted as final". For multi-operator stations, the FULL names and all call signs (legible) of all operators must be listed.
14. The Email address for this year's JMMFD contest should be setup a few days before the contest, and I would suggest to those who will be sending in your Logs electronically, to send in a test email with the words "TEST JMMFD 2019", in subject the line and also set the "REQUEST READ RECEIPT flag (if it is available on your e-mail system.). Your call sign can then be added into the database for this year's contest. When actually submitting your log for the contest, if you do not receive an e-mail acknowledging receipt of your log, then the log has not been received.
15. Paper logs may be posted to "John Moyle Contest Manager, 27 Laguna Ave, Kirwan 4817 QLD". Alternatively, logs may be e-mailed jmfd2019@wia.org.au, vk4ae@wia.org.au, or snail mailed via the WIA Contest Manager, JMMFD, P.O. Box 2042 Bayswater, VIC 3153. Club stations must forward in the first instance an electronic version of their log. Club Stations who submit only a paper log will have that log returned as unreadable, due to the very large amount of work involved in entering and checking large paper logs.
16. The following formats are acceptable: Microsoft Excel or Word, ASCII text or the print log output file from electronic log programs such as VK Contest Log (VKCL). Logs sent by disc or e-mail must include a summary sheet and declaration, but the operator's full name (legible) is acceptable in lieu of a signature. A PDF copy of a handwritten log is also not acceptable and will also be rejected.
17. Because of the altered publishing lead time of AR Magazine Logs must be postmarked no later than 12th April 2019, and as the post is now so slow and unreliable, logs despatched on the last day might not arrive in time. Electronic versions of the log will be received until midnight 21st April 2018. Any logs received after this date will be returned as ineligible.
18. If any station works the same station multiple times on any band or on any mode, both stations should each enter a log to verify those contacts. This rule was introduced to overcome a problem experienced in previous contests where a portable station worked a significant number of home stations, but those home stations did not enter a log, so there were a very large number of unverifiable contacts.

Certificates and Trophy

19. At the discretion of the Contest Manager, certificates will be awarded to the winners of each portable section. Additional certificates may be awarded where operation merits it. Note that entrants in a 24 hour section are ineligible for awards in a 6 hour section.
20. The Australian WIA Affiliated club station, with the highest overall score will be awarded the President's Shield, a perpetual trophy held at the Executive Office, and will receive an individually inscribed wall plaque as permanent recognition.

Disqualification

21. General WIA contest disqualification criteria, as published in Amateur Radio from time to time, applies to entries in this contest. Logs which are illegible or excessively untidy are also liable to be disqualified.

Definitions

22. A portable station comprises field equipment operating only from a portable power source, e.g. batteries, portable generator, solar power, wind power, independent of any permanent facilities and which is not the normal location of any amateur station. Mains power supply is not to be used for any part of the portable installation lighting or even battery-charging.
23. All equipment comprising the portable station must be located within an 800m diameter circle.
24. A single operator station is where one person performs all operating, logging, and spotting functions.
25. A single operator may only use a call-sign of which he/she is the official holder. A single operator may not use a call-sign belonging to any group, club or organisation for which he/she is a sponsor except as part of a multi-operator entry.
26. A multi-operator station is where more than one person operates, checks for duplicates, keeps the log, performs spotting, etc.
27. A multi-operator station may use only one call sign during the contest.
28. Multi-operator stations may only use one transmitter on each band at any one time, regardless of the mode in use.
29. All stations, both Single and Multi-operator stations must submit a separate log for each band.

30. Logs submitted electronically can use a separate Excel worksheet for each band linked to a summary sheet. A typical example is shown at http://www.wia.org.au/contests/ which can be copied and adapted for the individual use of either a single or multi operator station.
31. Any station operated by a club, group, or organisation will be considered to be multi-operator by default and are not to use any of the permanent club facilities.
32. None of the portable field equipment may be erected on the site earlier than 28 hours before the beginning of the contest.
33. Single operator stations may receive moderate assistance prior to and during the contest, except for operating, logging and spotting. The practice of clubs or groups providing massive logistic support to a single operator is, however, totally against the spirit of the contest. Offenders may be disqualified, and at the discretion of the Contest Committee, may be banned from further participation in the contest for a period of up to three years.
34. Phone includes SSB, AM, Simplex FM and Simplex D-Star.
35. CW includes CW hand or computer generated. Fully automatic CW operation is not permitted. CW contacts will score 4 points for HF and 4 points for VHF & UHF contacts plus the distance points.
36. Digital modes such as PSK31, RTTY, and packet may be used in the contest, but if they are, they shall be classed as Digital. Other modes such as ATV may be used and will be classed as Digital for scoring. Digital contacts will score points at the same rate as Phone. The new fully automatic modes such as FT8 and others simply cannot transfer sufficient information to be eligible as a valid contact.
37. All amateur bands may be used except 10, 18 and 24 MHz. VHF/UHF means all amateur bands above 30 MHz. Note: On 50 MHz, the region below 50.150 has been declared a contest free zone, and contest CQs and exchanges may only take place above this frequency. Stations violating this rule may be disqualified.
38. Cross-band, cross-mode and contacts made via repeaters or satellites are not permitted for contest credit. However, repeaters may be used to arrange a contact on another frequency where a repeater is not used for the actual contact.
39. Stations may make repeat contacts and claim full points for each one. For this purpose, the contest is divided into eight consecutive three-hour blocks: 0100-0359, 0400-0659, 0700-0959, 1000-1259, 1300-1559, 1600-1859, 1900-2159, 2200-0059 UTC. If you work a station at 0359 UTC a repeat contact may be made after the start of a new block providing they are not consecutive, or are separated by at least five minutes, since the previous valid contact with that station on the same band and mode.
40. Stations operating on Phone must exchange ciphers comprising RS plus a 3-digit number commencing at 001 for each band and incrementing by one for each contact.
41. Stations operating on CW must exchange ciphers comprising RST plus a 3-digit number commencing at 001 for each band and incrementing by one for each contact. Where the CW contact is with an overseas station that is unable or unable to give a valid serial number, the serial number shall be assumed to be 001.
42. Portable stations shall add the letter "P" to their own cipher, e.g. 59001P.
43. Multi-operator stations are to commence numbering on each band with 001.
44. Receiving stations must record the ciphers sent by both stations being logged. QSO points will be on the same basis as for Home Stations, unless the receiving station is portable.
45. The practice of commencing operation and later selecting the most profitable operational period within the allocated contest times is not in the spirit of the contest, and may result in disqualification. The period of operation commences with the first contact on any band or mode, and finishes either 6 or 24 hours later.

If anyone wishes to contact me privately to discuss rules etc., my home phone number is (07) 4723 4229, and my snail mail and e-mail address are as shown in the Log Submission section above.

Denis Johnstone VK4AE/VK3ZUX

Correction

In the last issue, we had a brief note that Chris Dodd had become SK. The correct callsign is **VK6DV**.

We apologise for the error.

Over to you

Modification of equipment

G'day Peter,

Firstly my thanks for to you and the publications team for producing a great magazine devoted to Amateur Radio.

I have to say at my age I much prefer the printed version of *AR* rather than reading it on an electronic device, even if the printed version comes at a cost to the membership fee.

Of course this has nothing to do with my age or less than 20/20 vision.

Now the second reason for this communication, not a whinge but an alert to my fellow amateurs.

I was surprised to see in the last issue of *AR* (Vol 86 Num 6) a request for assistance to modify amateur equipment to transmit on non-amateur bands and frequencies (Ed: in a Hamad).

Surely *AR* should not be promoting information that could lead to an offence against the Radio Communication Act and Regulations.

Going down this path could see an individual incur financial penalties, confiscation of equipment or jail or any of the foregoing under the Radio Communications Act and Regulations.

It would seem that some licensed amateurs are unaware of the licensing standards in Australia, so here are few points for my fellow amateurs that my give them a better understanding of the licensing requirements.

In the amateur service it is the individual that is licensed NOT the equipment. As a Standard or Advanced licence holder you have the privilege of being able to design, construct or modify transmitters for use on amateur bands and frequencies, with the caveat that no interference is caused to other RF services or electronic equipment.

By holding an appropriate Certificate of Proficiency / Licence you are deemed to have sufficient knowledge to do this.

This is not the case for non-amateur band equipment, such as the CB Service, Land Mobile, Aeronautical, Maritime services or WiFi computer links.

These services may also operate under a class licensing system, apparatus licence or system licence with appropriate technical standards.

The manufacturer or importer of the equipment intended for use in these services have to provide a statement of compliance usually provided by a certified testing organisation at great expense, that the equipment meets with technical standards published for use in that service.

If you look at the equipment that meets these standards you will find that they often have minimum of operator controls and operate at low or moderate power levels. Why? Because, in a lot of cases, the equipment will be operated by untrained or non-technical operators.

What you don't see are the tighter specifications for reduction of spurious emissions, frequency stability and the ability to operate in radio unfriendly environments (temperature, vibration, dirty/dusty environments to name few).

It would fair to say that most equipment designed for the amateur service would not meet the more stringent technical requirements for class licensing. This is why modifying amateur transmission equipment that may not meet the class licensing technical provision may lead to action against an individual under the Radio Communication Act and regulations.

Most of you will be aware that amateur VHF/UHF radio equipment sourced from Asia can simply be reprogrammed for use on say Bush Fire Brigade and SES frequencies.

Not with standing it is offence under the Radio Communications Act and regulations, the equipment performance after reprogramming can be degraded and the chance of spurious emissions goes up exponentially with the very high risk of causing interference to unrelated frequencies. Why because the equipment is not designed to operate on non-amateur frequencies.

Over the years many operators have purchased amateur HF transceivers for use in the Maritime and Aeronautical services. Stations operating SSB on fixed frequencies in these services because of the tighter class licence specification have a very limited receive tuning ability. Operators that have used amateur radio equipment have discovered to their cost that trying to successfully work stations with a class licence specification has proved extremely difficult or not possible using amateur service transmission equipment.

To summarise, it is an offence under the Radio Communications Act and Regulations to modify amateur service radio transmission equipment to operate on frequencies outside the amateur radio service.

You should also be aware that if you take the risk of modifying amateur transmission equipment to operate on non-amateur bands, with the advent of modern technology for scanning, tracing and direction finding it is a relatively simple task to find the source of the unauthorised transmissions.

I would grateful if you published my comments regarding modifying amateur radio equipment for non-amateur frequencies for the information of my fellow amateurs.

Regards,

Amanda Hawes VK1WX
(Licensed for 48 years)
WIA Assessor (15 years)

Electronics/Radio technician (for 51 years)

Check this link to ACMA setting out class licence conditions:

http://www.acma.gov.au/Google-Site-Search?q=Class%20licences

WIA Contest Website

To keep up to date with all of the major Australian contests, including rules and results, at the WIA Contest Website at:
www.wia.org.au/members/contests/about

Silent Key

William George Francis VK3HV

George, as he was known to us all, was born on 20 March 1933 in Wonthaggi. He grew up on his parent's dairy farm near Kilcunda and attended Kilcunda State School and Wonthaggi Technical School prior to commencing an electrical apprenticeship at the State Coal Mine at Wonthaggi.

George applied his new knowledge to good use on the farm, installing a 12 V DC lighting and electricity system, using a diesel engine driving a car generator to charge 12 V vehicle batteries. At the time, neighbours were battling with Alladin and Hurricane kerosene lamps.

George was also interested in film and photography, which later grew to include video. He set up his own dark room in his mother's pantry. He skipped developing and enlarging in the colour era but kept up later when digital photography ballooned. George was also a keen stamp collector.

His involvement in radio began with an old crystal set, a gift from a farmer friend. In the late 1940s, George began a hobby business installing and repairing war surplus radios into the local fishing fleet. As his reputation grew, this work expanded along the Victoria coast as far as Eden in southern NSW and west to Port Fairy. His father acted as driver until George obtained his driver's licence. A government Inspector visited in the early 1950s wanting to see his licence for his activities! Impressed by George's youth and exuberance, the Inspector assisted George to obtain the relevant licence and the two became firm friends.

George's workshop and radio shack were set up in his bedroom, with a bank of 12 V batteries. Mains power finally arrived at the farm in 1954.

Amateur radio was at the top of the list of George's interests. He enjoyed chasing DX and participating in Field Days.

After completing his apprenticeship, George moved to the Latrobe Valley to work as an electrician for the State Electricity Commission (SEC), working on the construction of Yallourn C and D stations.

In the early 1950s, George was called up for National Service and was posted to RAAF East Sale. It was during his time in service that he met his future wife Shirley. They married in January 1956 and set up home in the Latrobe Valley.

The introduction of television to Melbourne saw many in "the Valley" experiencing poor reception. George and some friends designed an antenna suitable for fringe areas and began a business to produce the antennas under the name Tel-Ray. The business grew and George left the SEC to focus on the antenna business. The success brought the attention of big business and they were forced out of operation. George subsequently found work as a TV repairman for companies around Gippsland.

George returned to the SEC as a powerhouse electrical operator until his retirement in 1989, having worked in the Yallourn, Hazelwood and Morwell power stations. During this period, he was seconded to the Electricity Commission of New Guinea as a Training Officer, taking up residence in Port Moresby. Whilst in PNG, George operated as P29HV.

George, Shirley and family returned to Morwell. They became involved with the Salvation Army, where George was an active uniformed soldier for a period.

George was involved in training Air Force Cadets at Sale and the Latrobe Valley as part of the RAAF Reserves.

George enjoyed fossicking for gold in the mountains around Walhalla, panning in the streams and also using a metal detector, with little success.

Following his retirement, George and wife Shirley travelled extensively. Journeys in Australia included travelling to Coober Pedy and the gem fields of Queensland.

George commenced his amateur radio life with the callsign VK3ZCG. That callsign has links through to today, with the noted Gippsland antenna business ZCG-Scalar. George upgraded to VK3ASV and later to VK3HV. As noted above, he also held P29HV whilst in PNG.

George was heavily involved with the WIA Victorian Division Eastern Zone, which evolved to become the WIA Vic. Div. Eastern Zone Amateur Radio Club and then simply Eastern Zone Amateur Radio Club Inc. George was awarded Life Membership of the Club in May 2013 on the occasion of the Club's 75th anniversary, along with David Scott VK3DY.

In recent years, George became less mobile and only occasionally attended Club meetings.

George departed this world on 29 October 2018.

Vale George VK3HV.

Russell Francis (brother) and Peter Freeman VK3PF

Silent Key

Joseph Eric Gelston VK7JG

Joe said he was led into building radio equipment by his eldest brother John (now VK7JL). Joe claimed to have quickly eclipsed his brother's ability to get the experiments working. This all happened at their family home in the rural town of Westbury in northern Tasmania.

Joe was first licensed with the call sign VK7ZGJ in 1965 while employed in the service department of an electrical retailer in Launceston; he soon became very active on 6 and 2 metres AM making contacts both local and DX.

In 1966 he moved to Port Kembla where he operated as VK2ZGN and finished his apprenticeship in electrical engineering.

He moved back to Tasmania in about 1968, obtained employment with AWA communications division. During this time he upgraded to the call sign VK7JG and somehow found time to marry Phyl. He also studied for and qualified for a Broadcast Station Operator's Certificate of Proficiency.

Joe became Secretary of Northern Branch WIA Tasmania Division and was later appointed to the position of Honorary Life Member of that Group.

In 1978 he left AWA to become self-employed as Gelston Communications.

He served three successive positions on WIA Tasmania Divisional Council: President, Secretary, then was the Division's Federal Councillor for a number of years.

He was appointed Life Member of WIA Tasmania Division then, after the restructure of WIA in 2004, received a phone call from National President, Michael Owen (SK) offering transfer of the redundant Divisional Life Membership to the now National WIA. Joe accepted.

In 2014 Joe received a President's Commendation from the WIA for services to Amateur Radio, nominated by NTARC. He was later made an honorary life member of the Cradle Coast Amateur Radio Club and given formal recognition from the Radio and Electronics Association of Southern Tasmania for his services to Amateur Radio.

Following the departure of Peter Frith VK7PF (SK), more than 30 years ago, from what is now Air Services Australia; Joe was given keys to the Mt Barrow aviation communications facility for access to the amateur repeater station there. Joe maintained, upgraded and made improvements to that installation until it was recently moved to Mt Arthur.

Joe played a major role in the establishment of the repeater sites on Mt Arthur, Barren Tier and on Snow Hill. He later added a link repeater to the installation at Barren Tier to facilitate relay of the weekly broadcasts from Queens Domain Hobart. The UHF repeaters on Mt Arthur now operate with the call sign VK7RJG as a tribute to Joe.

During this time Joe was the major contributor of free labour for setting up a Coastal Watch Marine Radio Service with two base stations and a mountain-top repeater.

He donated and modified much of the equipment for all the above installations and performed most of the maintenance until a few months ago.

For many years, Joe undertook and assisted with maintenance of Amateur and CB radio repeaters on at least six other sites, all without labour charge.

He also inherited the responsibility of maintaining/rebuilding the four co-sited Amateur Radio beacon stations, VK7RAE, at Don Heads. As mentioned, Joe became associated with building Amateur Radio beacon stations very early; that association continued for about 50 years. These beacons have formed the centre of some serious scientific radio propagation observations.

Meanwhile the activities of Gelston Communications grew and prospered; the company took on a Motorola agency and Joe and Phyl travelled to the USA as part of an undertaking for Joe to become Australian agent for 'Talkie-Tooter', a system that provides communications for cable logging workers. Joe was also known to make emergency callouts to the Tasmanian Ambulance Service Communications at any hour.

During all this time Joe maintained a high level of activity from his home station; his specialty was weak signal work on the VHF/UHF bands for which he received a number of awards including a DXCC on 6 metres.

Joe became a pioneer of digital modes, specialising in EME communication for which purpose he held a high power licence. His life-long love of fishing was combined with bush walking and SOTA, sometimes all on the one day, particularly when on Flinders Island.

Rex VK7MO told me that, after his retirement as head of the Australian Antarctic Division, he was considering renewing his interest in Amateur Radio, however, he was told by local amateurs: "You can't get out of Hobart on VHF". Someone suggested he contact Joe. Rex did this, which led to an alliance that not only rekindled Rex's interest in Amateur Radio but led to history making achievements which, fortunately, Rex is continuing.

The October 2009 'cloud bounce' optical contact across Bass Strait is perhaps their most memorable collaborative effort. Others include EME and 10 GHz DX contacts.

In recent years Joe became an exponent of the Automatic Packet Reporting System (APRS), using it during two crossings he and his brother, Gerard, made of the Simpson Desert and other remote parts of Australia. Many of us were able to view their progress on these expeditions thanks to Australia's APRS network.

Some tributes on social media illustrated Joe's persona. One from Peter VK5PJ amused his family very much; it read: "A kind and helpful soul who I am sure will be checking out God's antenna system and suggesting some improvements to it".

Joe's help to other amateurs far and wide, for affecting repairs and assembling equipment including antenna installations, spanned more than 50 years; he rarely accepted payment. Such good works were not confined to radio amateurs but included not-for-profit organisations such as community broadcasters and the coastal marine service as mentioned.

It is ironic that a man who never smoked should die of lung cancer. His funeral was attended by an estimated 400 people.

Joe is survived by his widow Phyl, daughter Charmaine, son Chris, granddaughters Zoe and Evey.

Vale Joe.

Allen Burke VK7AN

DX Awards

Marc Hillman VK3OHM/VK3IP

Below are some interesting statistics extracted from the WIA DX Awards system for 2018.

There were only 78 active users in 2018, i.e. people who uploaded their log to the awards system. From a WIA membership base of ~4,000, this is a relatively low participation rate. The WIA has one of the best awards systems in the world, which is incredibly easy to use. I appreciate that not everyone is interested in awards, but the award system is free to members, and it is a shame that more people don't take advantage of it. Despite the low participation, the data is still reflective of usage across all Australian amateurs.

Of particular note is that FT8 has dominated the year, with nearly 60% of all QSO being FT8. This is reflective of the fact that it is a new and interesting mode, and that propagation conditions are poor.

The WIA DX Award system can be found at: *http://www.wia.org.au/members/wiadxawards/about/*, and I recommend you take advantage of the free service. It is very easy to use. All you need to do is upload an ADIF log.

DX Awards Annual report for 2018

Metric	Value		
Active users in system			78
QSO added in year			104918
QSO held by end of year			2252758
QSO breakdown by mode	FT8	61658	58.8%
	SSB	23264	22.2%
	CW	14533	13.9%
	RTTY	4796	4.6%
	FM	334	0.3%
	PSK	127	0.1%
	JT65	92	0.1%
	MSK144	43	0.0%
	T10	25	0.0%
	AM	18	0.0%
	JT9	8	0.0%
	SSTV	4	0.0%
	OLIVIA	4	0.0%
	DSTAR	3	0.0%
	THOR	2	0.0%
	PKT	1	0.0%
	MFSK	1	0.0%
	HELL	1	0.0%
	DIGITALVOICE	1	0.0%
	QRA64	1	0.0%
	TOR	1	0.0%
	FSK441	1	0.0%

Metric	Value		
QSO breakdown by band	20 m	31610	30.1%
	40 m	30340	28.9%
	30 m	12080	11.5%
	17 m	9591	9.1%
	80 m	7884	7.5%
	15 m	7719	7.4%
	6 m	1572	1.5%
	160 m	1417	1.4%
	10 m	1267	1.2%
	12 m	798	0.8%
	2 m	426	0.4%
	70 cm	174	0.2%
	23 cm	35	0.0%
	13 cm	2	0.0%
	9 cm	2	0.0%
	3 cm	1	0.0%

Metric	Value	
New certificates issued		119
New certificate breakdown by type	Grid Square	33
	DXCC Multi-band (1)	21
	DXCC Multi-band (3)	20
	DXCC Multi-band (5)	10
	Worked All VK Call Areas HF	6
	Worked All States VHF	5
	DXCC Multi-mode (Open)	5
	DXCC Multi-mode (Digital)	4
	DXCC Multi-mode (CW)	3
	IARU Worked All Continents (Basic)	3
	Antarctic	3
	DXCC Multi-mode (Phone)	2
	DXCC Multi-band (7)	2
	DXCC Multi-band (9)	1
	IARU Worked All Continents (5)	1

Metric	Value	
DXCC Updates/Upgrades		1395
Updates/Upgrades breakdown by type	DXCC Multi-band (3)	305
	DXCC Multi-band (1)	299
	DXCC Multi-band (5)	246
	DXCC Multi-band (7)	146
	DXCC Multi-mode (Digital)	114
	DXCC Multi-mode (Open)	107
	DXCC Multi-mode (CW)	74
	DXCC Multi-mode (Phone)	56
	DXCC Multi-band (9)	48

WIA DX & operating Awards

WIA offers a range of operating awards, including DXCC, VHF & UHF and many other awards.

Details can be found at: *http://www.wia.org.au/members/wiadxawards/about/*

Contributions to *Amateur Radio*

AR is a forum for WIA members' amateur radio experiments, experiences, opinions and news.

Your contribution and feedback is welcomed.

Guidelines for contributors can be found in the AR section of the WIA website, at *http://www.wia.org.au/members/armag/contributing/*

Email the Secretary: *armag@wia.org.au*

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